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Beyond our borders: CBPP awareness

Lesley van Helden

South Africa is currently recognised as free of contagious bovine pleuropneumonia (CBPP) by the OIE. However, this freedom is dependent on continuous surveillance for and awareness of the disease. In Southern Africa, only South Africa, Eswatini, Botswana and the southern part of Namibia are recognised as CBPP free. The disease is regarded as endemic in much of West, Central and East Africa.

There is a surveillance programme in place for CBPP in South Africa. The active surveillance component involves taking a set number of samples from areas identified as high risk owing to their proximity to international borders. The Western Cape is not included in these high-risk areas, but our province still plays an important role in passive surveillance for CBPP during farm visits. As a result, all officials should be familiar with the signs of CBPP in order to recognise outbreaks if they occur, and be able to tell animal keepers what to look out for.

CBPP is a disease of cattle, but it can also infect water buffalo, Asian yaks and American bison. It does not seem to affect African buffalo as it has never been reported in this species. The disease is caused by infection by the bacterium, *Mycoplasma mycoides* var. *mycoides,* and causes significant economic losses in herds it infects. Eradication of the disease is difficult and costly, but has been achieved by many countries, including South Africa, from which it was eradicated in 1924.

Early warning signs of an outbreak are sudden deaths of a small number of cattle, often without showing any clinical signs.

As the outbreak progresses, approximately 20% of infected animals show fever, a drop in milk yield and laboured breathing, grunting and coughing with nasal discharge. A higher proportion (40-50%) of infected animals show a milder form of the disease with respiratory signs and intermittent fever. As the disease becomes chronic, animals lose condition, become emaciated and die.

Once the disease becomes established in a herd, fewer acute deaths occur. Some animals are asymptomatic and play an important role in transmission as they can be persistently infected. If treated with antibiotics, some clinical cases may improve, but run the risk of also becoming chronically infected animals.

Classic post mortem signs of CBPP include marbling of the affected lungs (often only one lung is affected) and a large quantity of yellowish fluid surrounding the lungs. Over time this fluid coagulates and the consistency becomes thick. Adhesions of the lungs to the chest wall and fibrin coating the lungs are also seen in chronic cases.

Transmission is facilitated by infected droplets of breath or urine and therefore occurs most easily in scenarios of close, repeated contact between infected and healthy cattle. Airborne transmission is also possible over distances of up to 200m. The incubation period is usually three to six weeks, but may be as long as six months.

Any suspected case of CBPP should be reported immediately to the local state veterinarian, who will inform the provincial and national Veterinary Services. Testing of suspicious cases will be funded by DALRRD if an application is made by the local state veterinarian accompanied by the laboratory submission form.

Samples taken during a necropsy of a suspect case should include chest fluid and samples of diseased lung on ice. These samples can be used for antigen detection and bacterial culture. *Pasteurella* species are often cultured, but this result does not rule out a diagnosis of CBPP, as coinfections are possible.

From live animals, serum samples can be taken to test for the presence of antibodies. Antigen detection can also be done on nasal swabs as well as samples of nasal discharge, bronchoalveolar lavage or trans-tracheal wash.

A bull acutely infected with CBPP shows neck extension associated with laboured breathing (photo: Niang et al)

Outbreak events

An **ostrich** farm near **Tulbagh** tested positive for **avian influenza**. No virus was detected, but serology results indicate H6 exposure. No clinical signs of disease were seen in the ostriches.

Sudden deaths of **wild doves** and pigeons were reported from **Laingsburg**. Carcasses of laughing doves collected in the town tested positive for **pigeon paramyxovirus** (PPMV). Domestic pigeon owners in the area were advised to vaccinate their birds against Newcastle disease and PPMV.

A **sheep** farmer near **Darling** noticed two of his ewes losing weight late in 2020. After discussing the issue with his private veterinarian, one of the ewes was euthanased and samples taken tested positive for **Johne's disease**. The farm was placed under quarantine and the farmer plans to vaccinate his flock.

Salmonella enteritidis was detected during routine sampling of **chicken** neck skins at the abattoir. All birds in the batch were slaughtered and the meat detained and tested. All *Salmonella* tests on the farm of origin, located in the **City of Cape Town** metropole, were negative.

Lumpy skin disease was seen in **cattle** near **Caledon**. Clinical cases were treated symptomatically and the herd was vaccinated by a private veterinarian.

Cases of **erysipelas of swine** were detected after slaughter in two **pigs** from two different farms in the **Malmesbury** state vet area.

A small number of **sheep** on a farm near **Riviersonderend** were affected by **dermatophilosis** (lumpy wool), a bacterial infection of the skin by *Dermatophilus congolensis*.

Bovine ephemeral fever (three day stiff sickness) was diagnosed in **cattle** near **Riviersonderend** by a private veterinarian. The owner sees annual cases of the disease amongst his heifers.

A large outbreak of **canine distemper** is ongoing in **Ashbury** and the northern regions of **Montagu**. Welfare veterinarians are attempting to control the outbreak by euthanasing critically ill dogs and vaccinating clinically healthy ones.

Three outbreaks of **mange** in **pigs** were seen in **Chatsworth**, near Kalbaskraal.

A **dog** was seen with **sarcoptic mange** in **Chatsworth**. Dogs were also treated for mange at the **Beaufort West** office.

Dermatophilosis seen in sheep causing "lumpy wool" (Photos: J. Groenewald)

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EPIDEMIOLOGY REPORT

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African swine fever breaks out in Cape Town

Lesley van Helden

An outbreak of African swine fever (ASF) was confirmed in the Mfuleni area of the Cape Flats on 24 February, after an increase in mortalities was reported in pigs.

Clinical signs seen have included reddening of the skin, especially around the ears and hocks, paresis of the hind limbs with dog-sitting, anorexia and difficulty breathing (fig 1). The beginning stages of the outbreak were characterised by morbidity and mortality rates which were lower than would be expected during an acute outbreak of ASF in an immunologically naïve population.

Post mortem findings of infected pigs have included congestion of the ears, enlarged spleen, haemorrhages in the kidneys, gastrointestinal tract, hearts and lymph nodes and pulmonary oedema, congestion and interstitial pneumonia.

Initial cases were identified as serotype 2, which has previously caused outbreaks in other provinces, including the Eastern Cape and Gauteng in 2020 and the Eastern Cape, Gauteng and North West province in 2021.

The affected farming area of Mfuleni houses almost 6000 pigs belonging to approximately 150 different farmers. Livestock are kept in informal structures in close proximity to each other (fig 2).

Biosecurity practices are highly variable, ranging from farmers who enforce strict access control and hygiene measures (fig 3), to others who allow their pigs to roam free and forage for food (fig 4).

The entire Mfuleni area has been placed under quarantine, with individual quarantine notices being delivered to each owner during an intensive census and disease survey in the area. Pig sales from auctions in the affected state vet area have also been halted

This is the first time that an outbreak of ASF has been confirmed in the Western Cape. There was a probable outbreak in the 1930s in the Western Cape after pigs were moved from the north of the country. At the time it was not possible to distinguish between ASF and classical swine fever, but the epidemiology of the outbreak suggests it was more likely to have been ASF. The outbreak was controlled by stamping out infected pigs and took several years to eradicate from the province.

In the last few years it is clear that the epidemiology of ASF in South Africa has been changing, with evidence pointing towards the establishment of a domestic cycle in the country.

Many of the pig owners in Mfuleni reported movement of people and pigs from the Eastern Cape after the festive season, and this may have been the route of introduction of the disease into the Western Cape. It is likely that more introductions from other provinces and internal spread of ASF will take place through movement of people, pigs and contaminated objects such as vehicles, clothing and farming equipment. Control of the disease is therefore only possible with the education and co-operation of the public.

Figure 1: Pigs in Mfuleni showing discolouration of the ears and hind limb paresis as a result of African swine fever (Photos: R Niewenhuis)

Figure 2: Pigs in Mfuleni are kept in informal sties made from a variety of building materials (Photos: R Niewenhuis)

The best way to prevent the introduction of any disease onto a property is to maintain strict biosecurity. Pigs should be bought from reliable sources and new additions kept in quarantine for at least four weeks (during which they should show no clinical signs of disease) before being introduced to the herd. Non-essential visitors should not be allowed onto pig farms and staff should be provided with equipment and protective clothing such as overalls and boots for exclusive use on the property. Vehicles and equipment that come from elsewhere should be disinfected on entry. Food that can contain or be contaminated by pork or pork products should be avoided. If one has no choice but to feed swill, it must be cooked thoroughly by boiling it for an hour. Manure, dead pigs and any other waste should be disposed of responsibly, in a way that it will not contaminate surface or ground water. The virus remains viable for long periods (3-6 months) in body fluids and raw pork, so scavengers should not be able to access waste.

Figure 3: A farmer using F10 to disinfect the shoes of visitors. (Photo: M Fourie)

Figure 4: Free-ranging pigs wallowing in a polluted canal (Photo: R Niewenhuis)

Pig owners across the province are urged to be vigilant for any unusual mortalities in their pigs and report to the local state veterinarian. Signs to look out for include fever, not wanting to eat, redness of the skin, difficulty breathing and abortions in pregnant sows, but any unusual mortalities should be investigated even if the clinical signs do not match the classical signs of ASF. Some outbreaks may not present typically, and the earlier they are detected the more opportunity there is to minimise spread of the virus.

Reference:

Penrith (2013) History of 'swine fever' in southern Africa. *Journal of the South African Veterinary Association*. http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1019-91282013000100059

Beyond our borders: H5N8 avian influenza reported in humans and other mammals

Human infections with H5N8 influenza A strains from birds have been reported for the first time from Russia.

In December 2020, 150 workers that took part in containing an outbreak of avian influenza on a poultry farm in Astrakhan Oblast had nasal swabs and blood samples taken. Seven of the workers tested positive, with serology results indicating recent infection. An H5N8 influenza virus was isolated from one of the samples.

None of the seven positive workers showed symptoms of illness. A total of 24 of their close contacts were traced and no symptoms of illness were reported in this group.

Workers in Russia were infected with H5N8 avian influenza after containing an outbreak on a poultry farm

There is no evidence that the virus can be transmitted from human to human, and it is believed that all confirmed cases were infected by contact with infected birds. All 150 workers were given preventive antiviral therapy.

In November 2020, five mute swans (*Cygnus olor*) died at a wildlife rehabilitation centre in England. They were tested and found to be infected with H5N8 highly pathogenic avian influenza. About a week later, carcasses of four harbour seals (*Phoca vitulina*), one grey seal (*Halichoerus grypus*) and one red fox (*Vulpes vulpes*) that died at the same wildlife rehabilitation centre were submitted to the national animal health laboratory.

Histopathology of the tissues of these animals showed evidence of systemic viral infection. Subsequent testing detected an H5N8 influenza virus that was identical to that previously detected in the swans. All of the tested animals from this facility were wild animals being temporarily housed at the rehabilitation centre and their history and comorbidities were not known.

H5N8 avian influenza has been previously detected in two grey seals found dead in Poland in 2016 and 2017, providing further evidence of spillover between these species.

References:

WHO (2021) *Human infection with avian influenza A (H5N8) - the Russian Federation*. https://www.who.int/csr/don/26-feb-2021-influenza-a-russian-federation/en/

UK immediate notification of HPAI to the OIE: https://wahis.oie.int/#/report-info?reportId=30629

Shin et al. (2019) Highly pathogenic avian influenza A (H5N8) virus in gray seals, Baltic sea. *Emerging Infectious Diseases,* 25 (12). https://wwwnc.cdc.gov/eid/article/25/12/18-1472_article

Beyond our borders: foot-and-mouth disease in dogs

A sample from a puppy that was fed the carcasses of lambs on a foot-and-mouth disease (FMD) infected farm in Iran in 2016 was examined at the World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD).

The puppy was one of five young dogs that showed weakness and died within 48 hours of eating FMD-infected meat. Similar lesions were seen in the hearts of all five dogs from two different regions of Iran.

The cardiac tissue of one of the puppies was subjected to PCR and virus isolation at the WRLFMD and an FMD virus of serotype O was identified.

This is the first reported case of natural infection of dogs with FMD virus, though experimental infection of dogs has been successful in the past.

Although at this point in time infection of dogs with FMD is considered to be rare, this case provides evidence of the risk of feeding the carcasses of FMD infected livestock to other animals.

Reference:

Waters et al (2021) Foot-and-mouth disease virus infection in the domestic dog (*Canis lupis familiaris*), Iran, *BMC Veterinary Research*. https://bmcvetres.biomedcentral.com/articles/10.1186/s12917-021-02769-1

Puppies in Iran died after eating carcasses of lambs infected with foot and mouth disease

Outbreak events

Four **pig** herds in the Mfuleni area of **Cape Town** were confirmed to be infected with **African swine fever** (see article on page 1).

A case of **lumpy skin disease** in **cattle** was reported by a farmer north of **Beaufort West**.

Bluetongue was reported in **sheep** on two properties near **Murraysburg**. The affected sheep showed nasal discharge and coronitis.

Ringworm (dermatophytosis) was seen in a **calf** belonging to a small scale farmer near **Vredenburg** (fig 5). Treatment advice was given.

Figure 5: Signs of ringworm seen in a calf (Photo: M Swart)

Figure 6: Post mortem oedema of the jaw and liver damage in sheep caused by toxic plants (Photos: E van Wyk)

Coccidiosis affected Jersey bull **calves** less than three months old on a small farm near **Grabouw**.

Contagious pustular dermatitis (orf) was detected in four **sheep** flocks in the **Beaufort West** area. Autogenous vaccine was made to treat the outbreaks.

Sarcoptic mange was seen in **pigs** in four herds in **Klipheuwel** and **Atlantis**. A **dog** near Atlantis was also seen with sarcoptic mange.

Nasal worm caused by bot flies (*Oestrus ovis*) was seen in **sheep** near **Atlantis**.

Outbreaks of **geeldikkop** (secondary photosensitivity caused by plant toxicosis) affected many **sheep** in the **Beaufort West** area (fig 6). Most outbreaks could be attributed to the consumption of wilted *Tribulus terrestris* (duwweltjie), but on one farm near Klaarstroom, no *Tribulus terrestris* was present. There had been very little rain in the area and the only plant in abundance was *Pteronia pallens* (Scholtzbos), which produces hepatotoxins (fig 7).

Figure 7: *Pteronia pallens* (Photo: S Molteno)

Krimpsiekte caused by cardiac glycoside poisoning was reported from several farms in drier areas near **Laingsburg**, where very little grazing was available.

Acute **cardiac glycoside poisoning** as a result of tulp (*Moraea* species) consumption was seen near **Elim** in **cattle**.

An outbreak of **ulcerative balanoposthitis and vulvitis** (peestersiekte/pizzle rot) occurred in **sheep** in the **Beaufort West** area (fig 8). The farmer bought in new rams and within five weeks, clinical signs were seen in 80% of the rams and 30% of the ewes in the flock.

Figure 8: Lesions of ulcerative balanoposthitis and vulvitis in sheep (Photos: E van Wyk)

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Why can't we vaccinate against African swine fever?

Lesley van Helden

African swine fever virus (ASFV) is a large and complicated DNA virus. Many of its genes encode proteins that stimulate an immune response in the host, and some suppress the immune response of the host to allow the virus to invade the cells more easily. Variations of these proteins are present in the 24 known genotypes of ASFV in existence.

All 24 genotypes are present in Africa, where the disease is endemic in many countries and has been since the virus was first recognised in the early 1900s. Because ASF occurred only in Africa, other countries protected themselves from the disease using import regulations and, when outbreaks occurred, a policy of immediate culling to eradicate all potentially infected animals. These countries did so in order to be officially recognised as free of the disease, and using vaccination would interfere with that goal. There was therefore little interest or financial investment in developing a vaccine. However, after 2007, genotype II of ASF broke out in the country of Georgia and from there spread to much of Eastern Europe and Asia. Attempts to control the disease using the traditional method of culling were unsuccessful and in some countries the disease became established in wild populations of wild boar. The development of a vaccine therefore received renewed interest and work in this field has started in earnest.

The immune response to infection with ASFV relies on both the humoral (antibody producing) and cellular immune systems. Experimental inactivated virus vaccines have all been unsuccessful, as these vaccines induce antibody production only, and not the production of the T-cells needed to destroy cells that are infected with the virus.

Most current development efforts are therefore focused on the development of strains of live attenuated virus. This can be done by using gene-editing tools to remove virulence factors from field strains, though the resulting strains must then be tested to make sure they still induce a protective response. Due to the complex nature of the ASFV genome, gene deletion techniques that work to develop a vaccine from one strain of the virus may not work for another.

Using an isolate of the ASFV that caused the outbreak in Georgia in 2007 (ASFV-G), researchers at Plum Island Animal Disease Centre, USA, discovered that when they deleted a gene known as I177L, the resulting strain produced sterilising immunity against the original virus strain in inoculated pigs. Vietnamese researchers are now working on a vaccine based on these findings that they hope to produce and sell commercially later in 2021.

Researchers at the Harbin Veterinary Research Institute in China have also developed a live vaccine based on gene-deletion techniques. In the first stage of clinical trials on 3000 pigs, all pigs remained clinically healthy and the efficacy of the vaccine was above 80% in all groups given different doses. There were no adverse effects observed in vaccinated pregnant sows. Clinical trials are now being expanded to test the vaccine on 10 000 pigs.

While the use of a live attenuated virus vaccine seems like a promising option in the future, there are some challenges. It is not currently known whether live attenuated viruses may have the potential to persistently infect pigs or susceptible wildlife. It would not be possible to distinguish between animals infected with vaccine virus or with field strains of the virus, making local eradication of the disease more difficult. There is also only a limited degree of cross-protection between strains of ASFV, so a pig with immunity to ASFV-G may still be susceptible to disease caused by any other strain of ASF.

The development and use of a subunit vaccine would solve some of the problems of a live attenuated vaccine, but to do so is much more challenging. Because ASF has a large and complicated genome with many genes encoding proteins that contribute towards the immune response to the virus, the right combination of genes would have to be chosen for a subunit

Domestic pigs are susceptible to African swine fever (Photo: R Niewenhuis)

vaccine.

There is some progress on this front, as Pirbright Institute in the UK has developed a vectored vaccine using another virus that carries several ASFV genes to stimulate an immune response to ASFV. All pigs in the trial were protected from severe disease, but some developed clinical signs.

While the research being done is promising, we are far from having an easy solution in the African context. Any vaccine commercially available in the near future is likely to be protective only against the ASFV-G strain currently plaguing Europe and Asia, and may provide little to no protection against the genotypes circulating in Southern Africa. It also may be produced in limited quantities and for a price that is not feasible for many pig owners in Africa.

At this point in time, despite the potential for a vaccine in the future, our best and most reliable weapon against ASF remains the promotion of biosecurity measures on pig farms, for which pig keepers must take responsibility.

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Borca et al. (2020) Development of a highly effective African swine fever virus vaccine by deletion of the I177L gene results in sterile immunity against the current epidemic Eurasia strain. *Journal of Virology* 94 (7).

Bosch-Camós et al. (2020) African swine fever vaccines: a promising work still in progress. *Porcine Health Management*, 6:17.

Caiyu, L. (2020) China developed vaccine against African swine fever effective, to enter expanding trials. *Global Times*, 18 Aug 2020

National Hog Farmer (2020) Pirbright says African swine fever vaccine gives pigs 100% protection. 12 May 2020.

ter Beek (2021) Vietnam develops an ASF vaccine. What is the context? *PigProgress Health News*, 22 Jan 2021.

Wu et al. (2020) Current state of global African swine fever vaccine development under the prevalence and transmission of ASF in China. *Vaccines*, 8.

Beyond our borders: H5N1 HPAI in West Africa

Circulation of highly pathogenic H5N1 avian influenza has been confirmed and reported from several countries in West Africa in late 2020 and early 2021. The viruses are likely related to the new H5 variant in Eurasia, which is in the same clade (2.3.4.4) as the 2016/2017 H5 viruses.

The first reported outbreak came from Kano province in northern Nigeria in December 2020. Swollen wattles and deaths were seen in backyard poultry, including chickens, turkeys, peacocks and geese.

Later in December 2020, an outbreak occurred on a commercial layer farm in Senegal, with closed houses, 58% of birds died after showing clinical signs of cyanosis. congestion, lethargy and oedema. All 100 000 chickens on the farm were culled as a result.

In January 2021, 200km north of the affected layer farm, more than 800 wild great white pelicans died in Djouj National Bird Sanctuary in Senegal along the border with Mauritania. On the Mauritanian side of the border a similar situation was seen with about 500 pelicans reported dead from Diawling National Park. This area is a natural wetland that provides a stop-over point for birds that have crossed the Sahara desert from the north during their seasonal migration.

In Niger, outbreaks were reported from backyard chickens and a commercial layer farm in February 2021 and another commercial chicken farm in March 2021. All affected properties were in the Niamey region in the south-western part of country.

Also in March 2021, three outbreaks occurred in the area surrounding Bamako in south-western Mali. Two commercial layer farms were affected, as well as one property on which exotic chickens were kept.

There is evidence that the AI virus that caused the South African outbreaks in 2017 travelled from Eurasia via West Africa. It was most likely transported in a relay fashion within Africa, via wild waterfowl. We therefore urge the agricultural community to remain vigilant and to notify their local state veterinarian immediately should unusual mortalities in wild or domestic birds be seen.

References:

Fusaro et al. (2019) *Nat. Commun*. 10, 5310.

International Society for Infectious Diseases. *ProMED-Mail*. https://promedmail.org/promed-posts/

Lewis et al. (2021) *Emerg. Microbes Infect*. 10:1, 148-151

OIE World Animal Health information System. https://www.oie.int/wahis_2/public/wahid.php/

Great white pelicans (*Pelecanus onocrotalus*), which also occur in the Western Cape (Photo: Azurfrog)

African horse sickness vaccination permissions 2020

Reproduced with permission from African horse sickness controls: Vaccination permissions 2020 season by JD Grewar and CT Weyer of South African Equine Health and Protocols NPC

Introduction

Annual vaccination against African horse sickness (AHS) is compulsory in South Africa (Animal Diseases Act, 35 of 1984) except in the AHS free and surveillance zones in the AHS controlled area in the Western Cape province. Vaccination against AHS in these zones can only be performed following written approval from the Veterinary Services of the Western Cape Department of Agriculture (WCDOA). Permission to vaccinate against AHS is only granted for vaccination to be performed between 1 June and 31 October each year. This vaccination period is based on the potential for vaccine virus re-assortment/reversion to virulence and the risk of transmission during periods of increased vector activity. The restricted vaccination period mitigates this risk.

The process for vaccination permissions is summarized and available at http://jdata.co.za/myhorse/documents/infographics/Vaccination%20Schema/1.%20Vaccinating%20against%20AHS%20in%20the%20Free%20and%20Surveillance%20Zone.pdf. This report briefly summarises the vaccination permission applications that were received and the descriptive statistics of those permissions that were issued. Permissions are given on an individual horse basis, with horses associated with specific holdings, and the information is analysed as such.

Summary of permissions issued

The total permission applications received are shown in Table 1 with their comparisons to previous seasons. Historically there are approximately 1100 applications received each year, corresponding to 7300 horses, and permissions are given for approximately 96%. It is likely that COVID-19 restrictions and impacts had an influence on the 2020 season as numbers were slightly lower than previous years. By far the majority (206 of 215 – 95.8%) of declined applications in 2020 related to invalid or non-existent passports. This is similar to previous years.

Thirty-nine veterinarians and veterinary practices were registered as the associated vet likely to perform the vaccination, with the top five practices responsible for vaccinating 78.13% of the permission granted horses (n= 6476), and the top ten practices responsible for 90.5% of all permission granted horses.

The most common (89.4%) reason for requesting permission to vaccinate was to enable horses to comply with AHS movement requirements. This is also similar to previous years.

We now have four years of detailed, individual horse information for the vaccination permission process in the AHS controlled area. 4457 (4556 in 2018-2019) horses that were granted permission in 2020 had also been granted permission in 2019, making up 68.8% (62.1% in 2018-2019) of the total for the year. 2211 horses were granted permission to be vaccinated in 2017, 2018, 2019 and 2020, accounting for 34.1% of permission granted horses in 2020. There are currently 16318 horses registered in the AHS surveillance and free zone.

Conclusion

Vaccination coverage within the AHS controlled area, including the AHS surveillance and free zone continues to be fairly comprehensive with approximately 40-50% of the known population being vaccinated based on permissions requested during any year. 13342 different horses have been vaccinated in the AHS surveillance and free zone in the last 4 years (i.e. since 2017). A high number of those horses are associated with repeat requests from year to year, and also, since vaccination is a prerequisite for movement into the controlled area, any new adult horses entering the controlled area will be vaccinated already.

References and Acknowledgements

We are grateful to both horse owners and veterinarians for their patience during the vaccination permission season. We are grateful for the continued support of the Western Cape Veterinary Services who assist in this program and in particular Dr Gary Buhrmann from State Vet Boland. We acknowledge team members from the SAEHP: Danielle Pienaar; Esthea Russouw; Gillese de Villiers; Marie van der Westhuizen; Johanne Jacobs and Lizel Germishuys who performed much of the data processing for the vaccination permission system.

Table 1: Number of applications received for vaccination permissions with associated horses. Granted applications are shown with a percentage of the total in brackets.

Year	Applications received/ Associated holdings	Total horses applied for	Total horses granted
2017	1078/647	7183	6893 (96%)
2018	1117/606	7277	7058 (97%)
2019	1108/610	7330	7044 (96%)
2020	976/567	6691	6476 (97%)

Outbreak events

Pigs on holdings belonging to 13 owners in **Mfuleni** tested positive for **African swine fever** in March, bringing the total of affected owners in the area to 17. Seven of these holdings have been depopulated or all of the pigs have died. There are therefore ten currently active confirmed outbreaks in Mfuleni. Clinical signs seen in the area have included depression, loss of appetite, redness of the skin, dyspnoea, bloody or foamy discharge from noses and mouths, hind limb weakness and acute deaths.

A pig farmer in the town of **Wilderness** bought 30 new piglets from a seller in a nearby informal settlement in mid-February 2021. Approximately three weeks after he had brought them to his small farm, the farmer introduced the piglets to a commercial feed ration. Within eight hours, the pigs showed anorexia, respiratory distress and hind limb weakness. Only the newly arrived pigs were affected, of which 25 died over a five-day period. Five runts were the only survivors. Because none of the other pigs on the farm were affected, the cause of the deaths was suspected to be oedema disease as a result of the feed, but subsequent lab results confirmed **African swine fever**. The farm was placed under quarantine and was inspected by officials several times. The dead pigs were buried on the farm. No further clinical signs were seen for 30 days since the last death and quarantine was thus lifted after the pens had been disinfected.

A two-year-old spayed female **dog** presented to a private veterinarian in **Cape Town** with lameness of the front limb. During a diagnostic work-up, evidence of discospondylitis was seen on radiographs taken of her spine. A subsequent blood culture confirmed infection with ***Brucella canis***. The owners of the dog elected to euthanase her. The dog had been adopted from an animal welfare organisation as a puppy and did not show any clinical signs of brucellosis. The other dog in the household will be tested for *Brucella canis*.

On a small holding on the outskirts of **Langebaan**, a **bat-eared fox** approached a house and lay down in the garden. It appeared disorientated, but was not aggressive. The fox was shot and its brain submitted for **rabies** testing, with a positive result. The dogs and cats on the property were revaccinated and dogs and cats on other properties in the vicinity were also visited and vaccinated by an official.

An **ostrich** compartment in the **Mossel Bay** area tested positive for **H7 avian influenza** antibodies in February.

This month, evidence of **H6 avian influenza** infection was found on an **ostrich** compartment in the **Tulbagh** area, within 15km of another farm detected to have H6 AIV antibodies in December 2020 and belonging to the same owner. A second ostrich compartment, in the **Riversdale** area, tested AI seropositive. Follow-up testing has resulted in negative serological tests for H5, H6 and H7 AIV, and negative H5, H6 and H7 PCR tests after a suspect positive AIV PCR test. This indicates infection with a low pathogenicity, non-H6 virus.

Sheep on shared grazing in the **Darling** area began losing wool (fig 1) and itching. Upon inspection by a state veterinary official, many sheep were found to be infected with **sheep scab**. The property was placed under quarantine and livestock belonging to all four owners on the farm were treated under official supervision.

Layer **chickens** on a commercial farm near **Malmesbury** tested positive for ***Salmonella gallinarum*** after the mortality rate increased and necropsies showed congestion and oedema of the lungs, white spots on spleens and enlarged livers with petechiae. The house was depopulated, disinfected and a longer resting period will be in place before restocking.

Salmonella enteritidis was detected on environmental swabs taken from breeder **chickens** near **Paarl**. The flock was slaughtered out as a result.

Over a two-week period, young **racing pigeons** in a loft in **Paarl** stopped eating, vomited, became lethargic and died. Post mortem findings included haemorrhages in the gizzard and intestines, green diarrhoea and enlarged livers. The pigeons tested positive for **pigeon paramyxovirus** (PPMV). Only birds originating from a single supplier were affected, as the rest of the flock had been vaccinated against PPMV. The flock was revaccinated in response to the outbreak.

Ten **laughing doves** (*Spilopelia senegalensis*) and a **Cape canary** (*Serinus canicollis*) that were found dead in a

Figure 1: Sheep showing wool loss caused by sheep scab (Photo: M Vrey)

suburban garden in Durbanville, **Cape Town** also tested positive for **pigeon paramyxovirus**. No poultry or other domestic birds are kept on the property.

An adult male **chacma baboon** was found in the **Franschhoek** area with difficulty breathing, weak and underweight. He was euthanased and submitted to the Stellenbosch Provincial Veterinary Laboratory, where a necropsy showed numerous abscess-like lesions, some with necrotic centres, in the lungs, kidneys, spleen, liver and lymph nodes. Histopathology of the lesions revealed granulomatous inflammation with high numbers of acid-fast, rod-shaped bacteria. The clinical signs and post-mortem findings are highly suspect for a case of **tuberculosis** caused by *Mycobacterium tuberculosis*. Mycobacterial culture is currently underway to confirm the diagnosis.

Outbreaks of **bluetongue**, affecting 14 **sheep**, were reported in four flocks in the **Beaufort West** area and one in the **Vredendal** area.

A case of sheep-associated **bovine malignant catarrhal fever** was reported from the **Beaufort West** area. One animal in a herd of 316 was affected.

A suspect case of African swine fever was investigated near **Stanford** and the cause of the outbreak found to be **greasy pig disease**. Also known as exudative epidermitis, greasy pig disease is caused by a generalised infection with *Staphylococcus* bacteria and causes depression and reddening of the skin.

Blackleg (sponssiekte) caused by infection with *Clostridium* bacteria was reported in a member of a herd of **cattle** near **Murraysburg**.

In the **Beaufort West** area, three **goats** died of **tetanus** two weeks after ear-tagging.

Fourteen **pigs** were seen to be affected by **sarcoptic mange** near **Melkbosstrand**.

An outbreak of **orf** (contagious pustular dermatitis) in **goats** near **Beaufort West** was treated with the application of zinc sulphate.

Four **lambs** born in small lambing camps in the **Beaufort West** area died of infection with ***Escherichia coli***.

Ascites (waterpens) was seen in **sheep** in the far north of the province closest to **Rietpoort** as a result of liver damage after feeding on kraalbos (*Galenia africana*)(fig 2). Three ewes were trocharised to drain excess fluid from their abdominal cavities (fig 3).

Sheep belonging to a small-scale farmer near **Riviersonderend** died after grazing near a landfill site. Upon further investigation it was discovered that a local bakery dumped bread and dough in the area, causing **rumen acidosis** in the sheep that ate it.

Figure 2: *Galenia africana* grows on disturbed land in dry areas of the province (Photo: L van Helden)

Figure 3: Draining fluid from the abdomen of a ewe using a trochar (Photo: C Lombard)

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
April 2021
Volume 13 Issue 4

African horse sickness outbreak in the protection zone

John Grewar and Lesley van Helden

Introduction

On 13 April 2021, officials from the Vredendal State Veterinary Office were notified of the deaths of three horses on a farm situated east of the Cederberg mountain range, on the other side of the Pakhuis Pass approximately 20km from Clanwilliam. The farm falls within the African horse sickness (AHS) protection zone of South Africa. An investigation was immediately planned and samples from a fourth horse that died later in the day on 13 April 2021 were taken by Animal Health Technician: Clanwilliam. The samples were tested on 14 April 2021 and AHS virus was detected.

Outbreak control actions

A preliminary outbreak-controlled zone was designated, that mostly follows the boundaries of the Cederberg Local Municipality. A 10km active investigation zone was designated around the infected farm (fig 1).

A website hosted to provide up to date information on this outbreak is available at www.myhorse.org.za/ahs2021. An interactive map of the outbreak-controlled zone is available on the website.

No equines are allowed to move out of, into, through or within the outbreak-controlled zone without a permit issued by Western Cape Veterinary Services. Roads that make up the border of the outbreak-controlled zone are not included in movement restrictions, and transport of equines along these roads is permitted.

Currently, no vaccination against AHS is permitted as this is prohibited in the AHS surveillance and protection zones in the high vector risk period between 1 November and 31 May each year.

Horse owners are encouraged to stable their horses from two hours before sunset until two hours after dawn to decrease the risk of biting midges (the vector of the

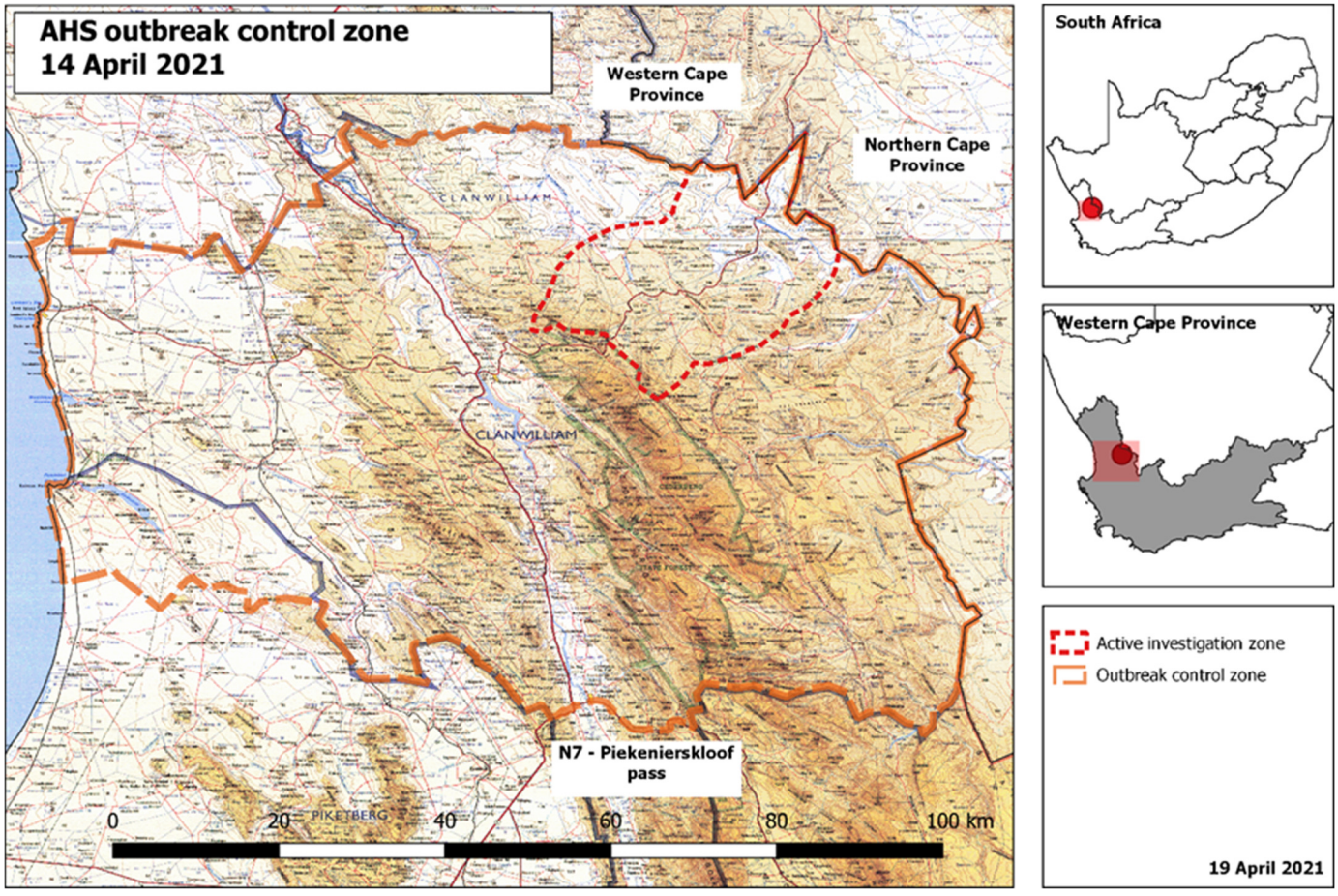

Figure 1: Outbreak control zones for African horse sickness in the Western Cape in April 2021

disease) having contact with their horses. Owners should also make use of a registered insect repellent and insecticide on their horses during the vector feeding periods as indicated above. Further protection of the stabled horses can be achieved by covering all stable openings with 80-100% shade cloth. Any owner within the AHS controlled area, and specifically within the outbreak-controlled area, detecting illness in horses involving unexplained fever, swelling of the head and neck and difficulty breathing should report the case to their local state veterinarian as quickly as possible.

Response and current situation

An initial census and surveillance programme by state officials in the area surrounding the affected property was performed to determine the extent of the outbreak. Officials worked outwards from the index farm with a focus on sampling all horses within the 10km zone (the active investigation zone), along the main road on which the affected farm is located. Other officials worked on the area immediately surrounding the active investigation zone, and this effort was primarily focussed on census and clinical surveillance. Two holdings were also sampled, to which horses had moved from the infected farm.

The initial census and surveillance programme was completed by the end of April 2021, by which time there had been a total of 30 cases of AHS with 14 deaths on the index farm. Clinical signs seen in affected horses have included swelling of the neck and supraorbital fossae, conjunctival oedema, dyspnoea and foam coming from the nostrils.

On 30 April, a horse died after fluid came out of its nostrils on a farm 11km north of the index farm. This was subsequently confirmed as the second AHS positive property.

There are two suspect cases (both deaths) within 20km and 100km of the index farm that have been sampled and results are pending. Surveillance was done on 275 different equids on 32 different farms by 5 May 2021. Of these, 64 were sampled for AHS testing from 13 farms. Over and above AHS testing, 45 equids were tested for equine encephalosis virus (EEV). EEV is also a midge-transmitted virus of the same family as the AHS virus. Twelve equines have tested positive for EEV.

The morbidity rate on the affected farm is currently 34% with a mortality rate of 28% and a case fatality rate of 80%. The AHS virus type has not been identified yet. The implications of this are that it is very unlikely that this virus is a live attenuated vaccine re-assorted or reverted to virulence strain, since the test that is used for typing would detect live attenuated vaccine strains.

Discussion

The origin of the virus on the affected property is not known. Investigations of legal movements have shown that there was unlikely to have been entry of AHS virus through horse introductions. Investigations into the source are ongoing and will include establishing the possibility of wind dispersal of infected midges. Knowing the type of the virus will also assist in this part of the investigation.

While there is still active circulation of AHS in the area, we are cautiously optimistic that the location of the outbreak could limit the spread of the virus. The Cederberg mountains to the west of the affected farm form a barrier to midges in a westerly and south westerly direction. Equine populations are low in the outbreak area and even more so to the north and north east, so spread here is also not likely to occur easily. There are small donkey, zebra, and horse populations along the eastern side of the Cederberg, but this area is enclosed by mountains to the south as well. Surveillance is ongoing here.

It is not currently known when the outbreak-controlled zone and associated control measures will be relaxed.

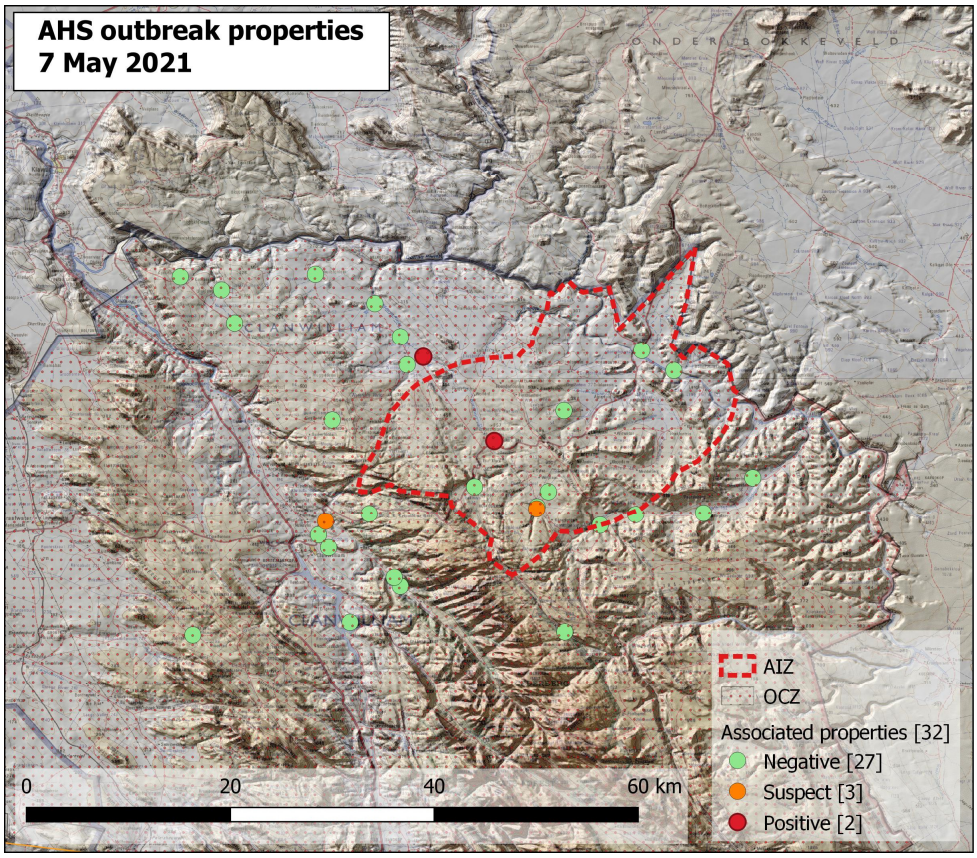

Figure 2: Properties visited for surveillance after the African horse sickness outbreak in the Western Cape in April 2021

Outbreak events

An outbreak of **African horse sickness** caused clinical cases and deaths on two properties in the **Clanwilliam** area. See the main article for details.

A **bat-eared fox** in the **Piketberg** area approached farm workers' houses where it attacked the dogs and was killed by them. There were no human contacts. The fox's brain subsequently tested positive for **rabies**. The dogs had been previously vaccinated against rabies and were vaccinated again in response.

Six outbreaks of **bluetongue** were reported in **sheep** from the **Great Karoo** near Leeu-Gamka, Beaufort West and Prince Albert. Sheep were seen with signs of foot pain and hypersalivation as a result of mouth lesions (fig 3). Morbidity rate ranged from 2-6% with mortality rate of 1-6%.

Outbreaks of **lumpy skin disease** (LSD) were reported in **cattle** near **Laingsburg** and **Greyton**. In the former case, five cattle in a herd of 80 were affected. Near Greyton, a group of 149 heifers of unknown vaccination status were bought in to a herd of cattle that were vaccinated against LSD. In the new group, 22 heifers showed clinical signs of LSD. The owner treated the sick cattle with antibiotics and anti-inflammatories and plans to vaccinate the group when they have recovered.

Skin lesions of **erysipelas of swine** were seen after slaughter on the carcasses of two pigs from a farm near **Barrydale**. The carcasses were condemned.

Near **Vanrhynsdorp**, approximately 15 out of a herd of 200 **ewes** began showing signs of **laminitis** and **coronitis**. The ewes were starting to lamb and their feed had been recently changed.

In a feedlot in the far north of the province near **Kliprand**, three month-old **lambs** died after showing signs of teeth grinding, arched backs and loss of appetite. Post mortem examinations of the lambs revealed the cause of death to be **abomasal impaction with sand**. The owner was advised to provide phosphate licks and creep feed for lambs to prevent them from eating sand. Grazing on natural veld is not currently possible due to drought.

Eight of 16 backyard **chickens** kept near **Stellenbosch** died after appearing depressed and lethargic. There were no specific findings on post mortem and samples taken tested negative for avian influenza and Newcastle disease. The suspected cause of the outbreak was **infectious coryza or fowl pox**, but the diagnosis was not confirmed as further testing was not done.

Many mortalities of **Egyptian geese** were reported on a farm near **Kalbaskraal** over a period of several weeks. Post mortem of three of the carcasses showed splenomegaly, foamy lungs, enlarged and haemorrhagic pancreas and haemorrhages in the gastrointestinal tract. The carcasses were autolysed and partially consumed by scavengers. Samples taken tested negative for avian influenza and Newcastle disease. The presumptive diagnosis is **bacterial pneumonia** as many bacteria were seen in the lungs on histopathology and tracheal cilia were destroyed. However, this may have been affected by the stage of decomposition.

Figure 3: Oral lesions seen in sheep with bluetongue (photos: J Kotze)

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EPIDEMIOLOGY REPORT

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May 2021
Volume 13 Issue 5

Highly pathogenic avian influenza (H5N1) breaks out

Laura Roberts & Lesley van Helden

Nearly a month after the first South African case of highly pathogenic avian influenza (HPAI) in 2021, the disease broke out in the Western Cape. Several outbreaks have been confirmed in the province since 4 May. The virus has been sequenced in many cases as the same clade 2.3.4.4b H5N1 subtype that occurred in other provinces.

Outbreaks in 21 locations were reported from the Western Cape this month (Fig. 1):

- Ten on commercial chicken farms
- Seven in wild birds (reported mostly per suburb)
- One in captive wild birds in a bird park
- Two in domestic and feral geese
- One in domestic turkeys

The commercial chicken farms comprised of:

- Two broiler farms
- Four broiler breeder farms (one rearing)
- Four layer farms (one rearing)

Wild bird species that were affected included:

- Great white pelicans (40/100 died)
- Hartlaub's gulls (7)
- Kelp gull (1)
- Grey-headed gull (1)
- African penguin (1)
- Egyptian goose (1)
- Spur-winged goose (1)

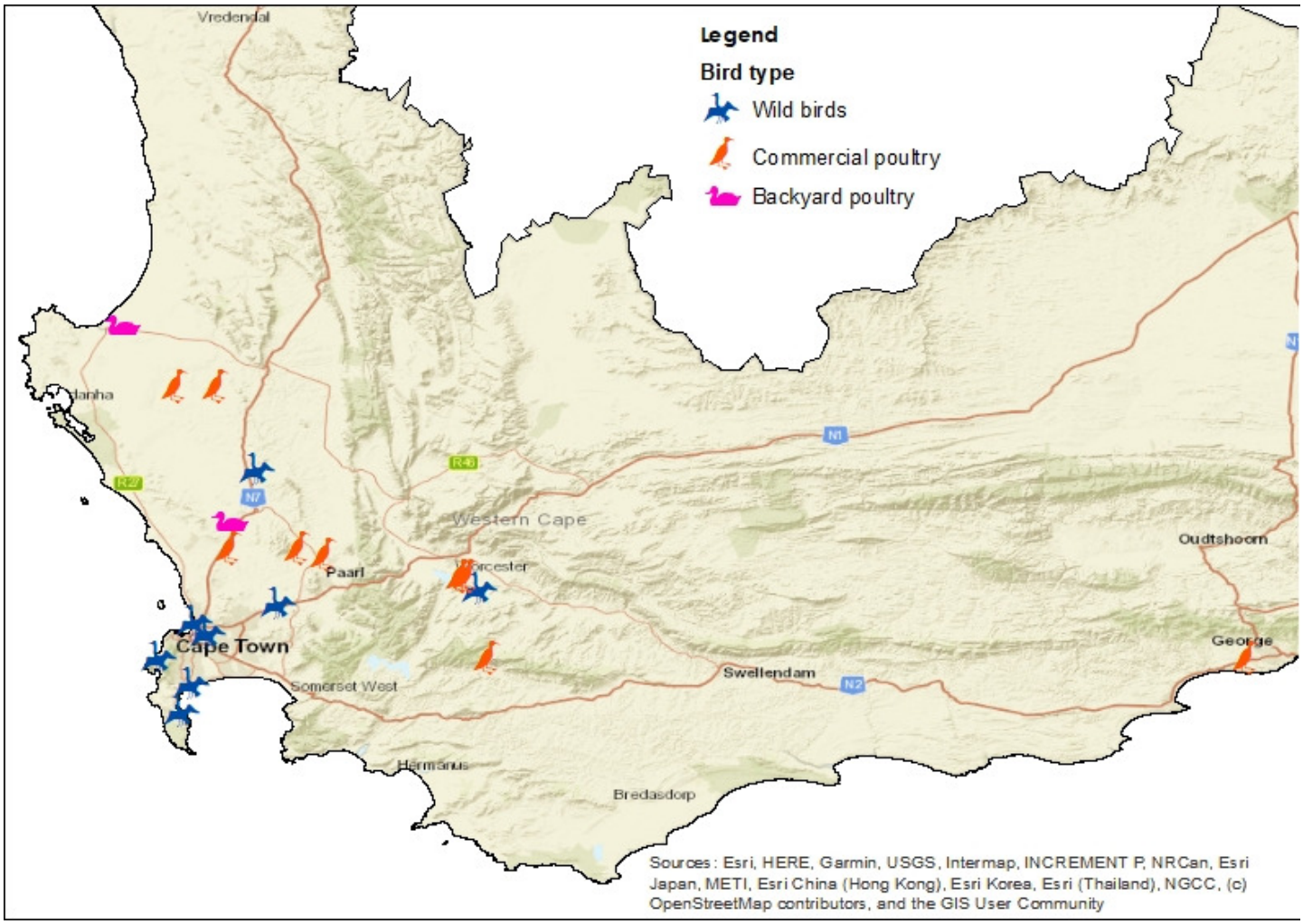

Figure 1: Approximate locations of outbreaks of confirmed and suspect H5 highly pathogenic avian influenza in the Western Cape in May 2021

From the available poultry farm capacity data, it is estimated that about 11% of the broiler breeders and 12% of the layers in the province were lost in May.

Typically, abnormal numbers of acute deaths were reported from the affected poultry farms, and sometimes lethargy and anorexia were observed in the chickens. Common post-mortem findings included enlarged and mottled spleens, haemorrhages in the visceral fat and reddened legs (Fig. 3).

Three of the affected commercial farms had multiple sites. On two farms the disease was isolated to one site after rapid culling and increased biosecurity measures (Fig. 5). One of these initiated culling after a 0.05% mortality rate and post-mortem signs suggestive of HPAI. Culling and burial (Fig. 2) was completed by the next day.

At least two single-site farms attempted to isolate the virus to a single house but neither was successful and had to cull the whole farm. Despite the rapid response on one farm, where the initial infected house was culled in close to 24 hours, a second house was affected a week later.

The odds of a commercial chicken farm having tested positive in May were four times higher if it was within 10km of another positive farm than if it was not. However, in one area where the viruses from both outbreaks have been sequenced, the viruses did not appear to be related. The risk of infection may therefore be related to the risk of wild bird exposure in that area. The sequencing evidence so far indicates multiple separate introductions from wild birds rather than transmission between farms. To support this, Egyptian and spur-winged geese on one positive commercial farm also tested H5 positive.

Clinical signs in the turkeys included green diarrhoea, difficulty breathing, bluish heads and hanging wings. Geese had swollen heads, twisted necks (Fig. 4), green faeces and appeared blind. The most common signs seen in seabirds were neurological, ranging from weakness to abnormal head movements.

Figure 2: Chicken carcasses bagged and ready for disposal after culling (Photo: M. Oosthuizen)

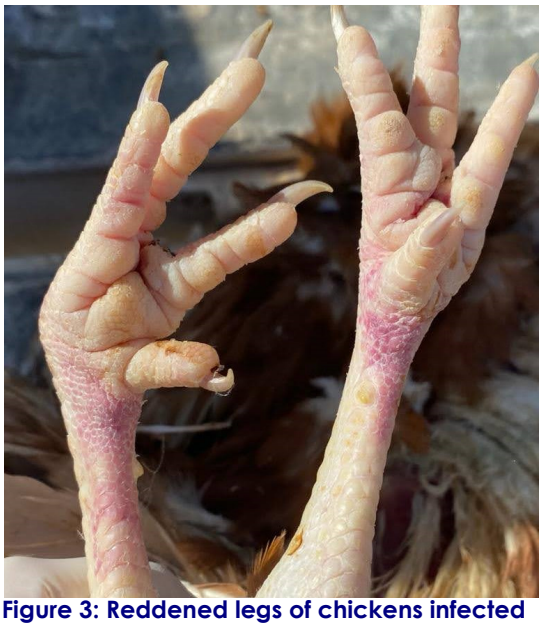

Figure 3: Reddened legs of chickens infected with HPAI (Photo: M. Oosthuizen)

Figure 4: Geese infected with HPAI, showing twisted necks (Photo: M. Swart)

Figure 5: Disinfection of facilities and use of lime on a chicken farm

African swine fever update

Since February 2021, African swine fever (ASF) outbreaks have been reported in four locations in the Western Cape province (Fig. 6). The outbreak on one affected property, a small farm near Wilderness, has since been resolved and quarantine lifted, but outbreaks remain active in three areas:

Mfuleni was the first area in which outbreaks of ASF were reported in February. Pigs belonging to 17 of the approximately 150 pig owners in the area were confirmed infected, with pig deaths continuing to be reported by new owners since the outbreak was confirmed. Of the approximately 5000 pigs kept in Mfuleni, at least 500 have died to date, but the mortality rate seems to have decreased since the outbreak initially occurred.

In late April, an outbreak of ASF was reported from an informal farming area near Saldanha after the local animal health technician (AHT) was alerted to pig mortalities by an agricultural extension officer. The area contained about 500 pigs belonging to 19 owners and many deaths occurred suddenly for 15 of the owners. The farmers had all shared a boar shortly before the outbreak and there were few to no biosecurity measures in place between pigs belonging to different owners. By the end of May only 82 pigs remained alive in the area.

In May, another ASF outbreak occurred amongst a group of small-scale farmers in the Strand area of Cape Town. Approximately 250 pigs are kept by 27 owners. Almost all pigs can have some contact with each other and several owners allow their pigs to roam freely.

The three areas in which there are active outbreaks remain under quarantine. Quarantine notices were given to each owner along with educational material. AHTs provide the community with disinfectant and lime and train farmers how to use these and implement biosecurity measures to prevent the spread of ASF. Pig owners are also advised how to dispose of dead pigs according to the local situation and environmental legislation. Each area is visited weekly by the local AHT to monitor the situation.

For an update on the ASF situation in South Africa, see the latest update from DALRRD, available at https://nahf.co.za/wp-content/uploads/ASF-update-2021-05-21.pdf

Given the wide distribution of ASF outbreaks in the Western Cape and the ongoing outbreaks in almost all other provinces of South Africa, the risk of introducing ASF when buying pigs is high. Pig owners and keepers should remain vigilant and practice strict biosecurity.

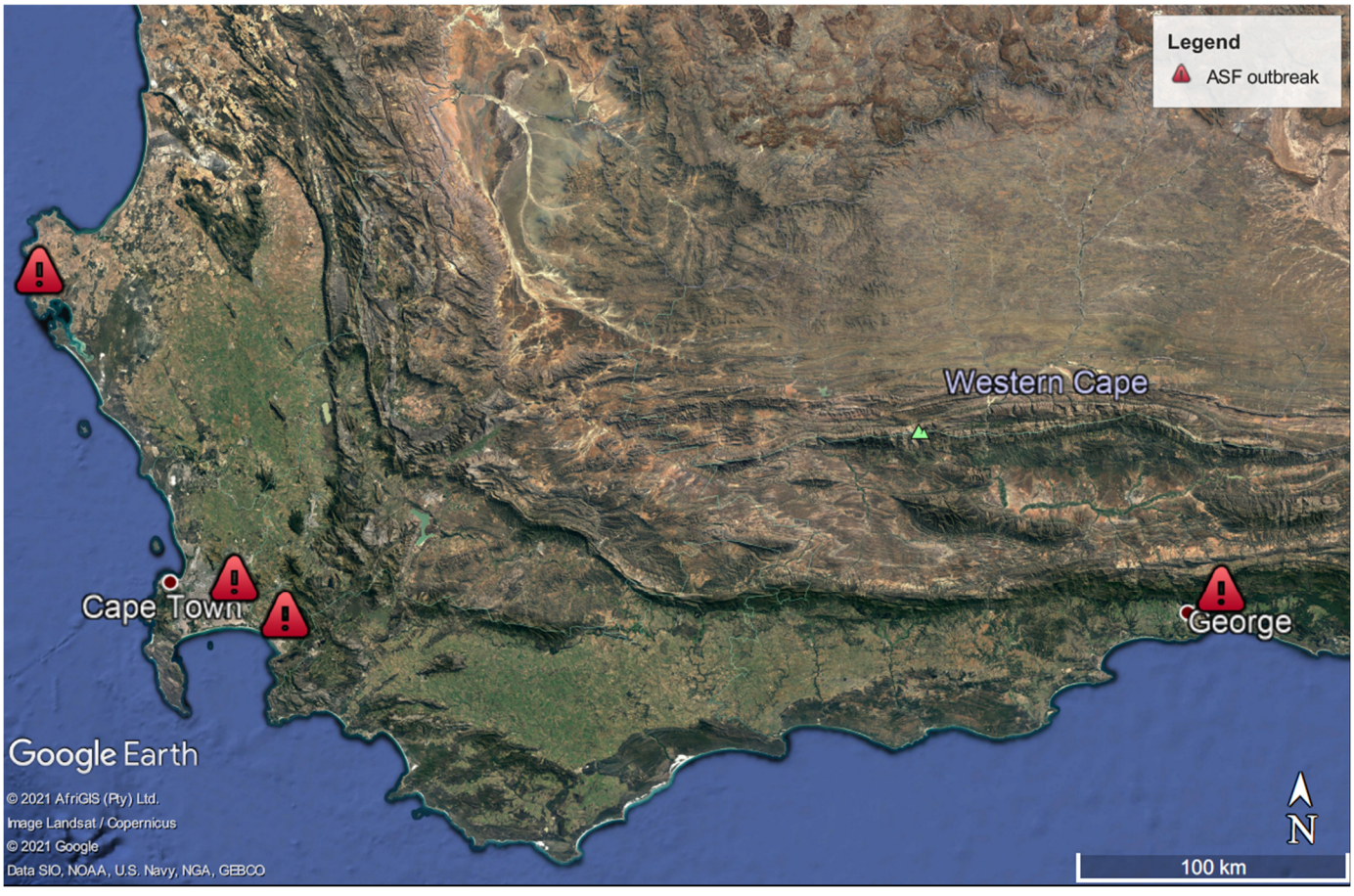

Figure 6: Locations of outbreaks of African swine fever in the Western Cape between February and May 2021

African horse sickness outbreak in the protection zone: update

On 14 April 2021, an outbreak of African horse sickness (AHS) was confirmed in the Cederberg local municipality. The outbreak occurred in the AHS protection zone which is the outer zone of the AHS controlled area of South Africa (Fig. 7).

As of 31 May 2021, there have been a total of 37 confirmed cases with 20 deaths. Cases have been reported on a total of four properties. Sampling of 72 different equids on 15 different farms has taken place. Laboratory results have confirmed 31 lab positive AHS cases. Over and above AHS testing, 57 equids were tested for the closely related equine encephalosis virus (EEV) and 18 equines have tested positive. In total, 33 holdings have been visited by officials and 278 individual equines have been associated in the investigation, with 241 equines classified as negative based on laboratory or clinical surveillance. Trace-forward investigations relating to movement from the outbreak control zone (OCZ) into the AHS surveillance and/or AHS free zone were completed, and no known movements of this nature took place after 1 March 2021.

The morbidity rate in the active investigation zone (AIZ) is currently 16.3% with a mortality rate of 9.69% and a case fatality rate of 59.46%. The AHS virus type has not been identified yet. Cases have decreased in recent weeks with only three having occurred since 6 May 2021.

Investigations into the origin of the virus are ongoing. The lack of typing of positive results to date makes it very unlikely that this virus is a live attenuated vaccine re-assorted or reverted to virulence strain, since the test that is used for typing would detect live attenuated vaccine strains. The location of the outbreak and decrease in temperatures is likely to have facilitated lack of spread and decrease in cases since early May.

For more information, please visit www.myhorse.org.za/ahs2021, that facilitates communication of the extent, control, and progression of the outbreak. Movement control measures are still in place. Due to the current outbreak, as well as recent confirmed cases of EEV, the start of the AHS vaccination period within the AHS controlled area has been delayed. The situation will be reviewed, and the risk re-assessed on a two-weekly basis.

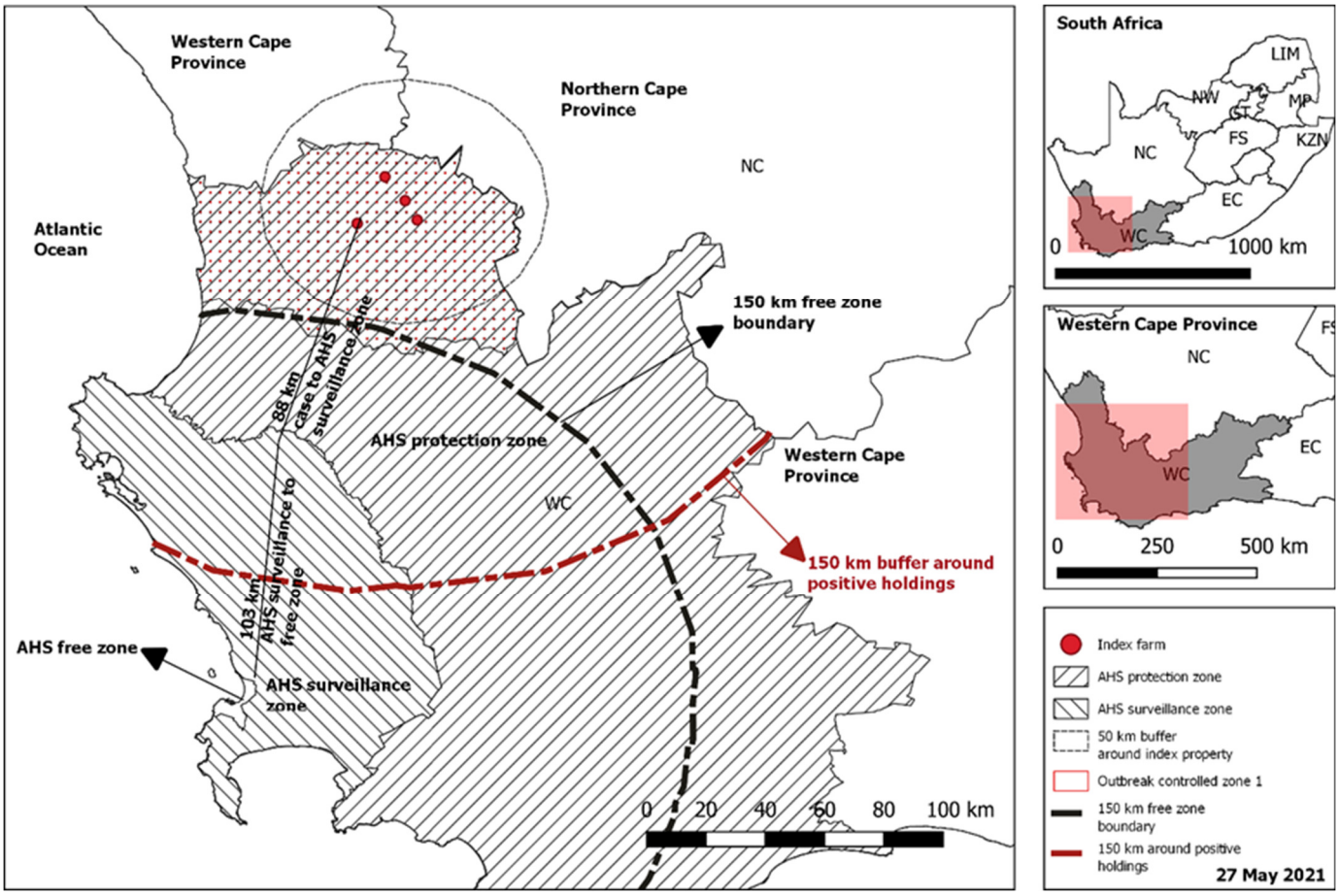

Figure 7: The location of the current outbreak-controlled zone and associated affected holdings. The 150 km buffer zone surrounding these holdings falls short of South Africa's AHS free zone in the Cape Town metropole and is therefore unlikely to have any substantial impact on future trade with the European Union.

Outbreak events

Cases of highly pathogenic avian influenza are detailed on page 1, African swine fever on page 3 and African horse sickness as well as equine encephalosis virus in the protection zone on page 4 of this report.

Several cases of **African horse sickness** were reported from the infected zone of the province:

⇒ In the Beaufort West state vet area, north of **Murraysburg** and **Nelspoort**, four properties experienced deaths of horses and clinical signs typical of AHS (Fig. 8). AHS was confirmed on three of the properties, but on the fourth the horse could not be sampled as it disappeared and is believed to have died in the veld.

⇒ A 20-year-old gelding near **Klawer** died overnight after showing clinical signs of AHS. Samples tested positive and the virus was typed as type 5. Although this case is about 50km from the outbreak in the protection zone around Clanwilliam, there is no evidence that the outbreaks are associated.

Figure 8: Horses in the Karoo died after showing clinical signs of AHS, including foam running from the nostrils and conjunctival swelling. (Photos: J. Pienaar)

A **bat-eared fox** on a farm near **Clanwilliam** appeared disorientated and let dogs play with it before the farmer noticed and killed it. The fox tested positive for **rabies**. The dogs had been previously vaccinated against rabies and were re-vaccinated in response to having contact with the fox.

Another **bat-eared** fox in the **Paardeberg** area near Paarl was seen in the veld with a stick in its mouth and chased the farm dogs aggressively. It was shot and killed by the farmer before it had any contact with humans or other animals. This fox also tested positive for **rabies**.

Ostriches in the **Albertinia** area tested PCR positive for H5 avian influenza on swab samples taken in April and May. The virus was later sequenced as **low pathogenic avian influenza (H5N2)**.

Feral pigeons in **Cape Town** were found ill and dead on the roof of an office building. The live birds were caught and euthanased. They subsequently tested positive for Newcastle disease virus. Further typing is awaited, but it is likely the cause of death was **pigeon paramyxovirus**.

Lumpy skin disease was reported in unvaccinated **cattle** on properties near **Klapmuts** and **Wolseley**. The morbidity and mortality rate was low, at approximately 3% and 0.4%, respectively. On one property a calf was affected, with classic skin lesions and a secondary eye infection, while on the other several cattle showed atypical lesions, including lumps on the inside of their nostrils and on their udders and scrotum, as well as swollen legs. On this latter property lumpy skin disease was confirmed by PCR.

Five pigs from a piggery near **Bonnievale** were diagnosed with **erysipelas of swine** at the abattoir after diamond-shaped skin lesions were detected by the veterinarian on duty at the abattoir. On inspection of the farm of origin, four more pigs were found with skin lesions. The pigs showed normal habitus and were eating well. These pigs were isolated and recovered fully after being treated with penicillin.

Distemper outbreaks were reported in **dogs** in **Touws River** and **Swellendam**. About 110 dogs were euthanased by animal welfare organisations and it is unknown how many dogs died naturally as a result of the disease.

Bovine babesiosis (redwater) was reported telephonically by a farmer near **Stanford**. One cow aborted and another two showed red urine. The owner reported a high tick burden and possible resistance against a pour-on product used recently .

Figure 9: Oral lesions caused by bluetongue in a sheep (photo: J. Kotze)

Bluetongue outbreaks were reported in **sheep** from the **Vanrhynsdorp** and **Murraysburg** areas, affecting a total of 13 sheep on four farms and causing eight deaths. Affected sheep showed fever, coronitis, loss of appetite, salivation and mouth lesions (Fig. 9). Farmers were advised to vaccinate their ewes after lambing season to prevent outbreaks in 2022.

Wool loss and inflamed skin were seen on a sheep inspected at an auction facility near **Paarl** (Fig. 10). The sheep was kept with six other sheep belonging to four different owners. A diagnosis of **sheep scab** was made on skin and wool scrapings taken from the affected sheep. The property was placed under quarantine and the owners decided to slaughter the sheep for own consumption. The skins and wool were burned.

An ill stray **pig** was found in **Cape Town** and taken to a local animal welfare organization, where it was euthanased on suspicion of African swine fever. Subsequent tests were negative for ASF, but a pure culture of ***Salmonella*** was obtained from the lungs.

Pigs kept in the **Ashton** area died suddenly after showing discolouration of their ears and ventral abdomens, epistaxis and foaming at the mouth and nostrils. The carcasses were sent to the lab for post-mortem and pooled stomach content tested positive for **phosphine toxin**. The pigs were fed grain from a nearby co-op and waste food from an retirement home and a school. The source of the toxin could not be determined with certainty.

Rumen acidosis was reported in several **sheep** near **Murraysburg** after their feed ration was changed.

Karoo paralysis, caused by the tick, *Ixodes rubicundus*, affected six **sheep** in a flock of 600 near **Three Sisters**.

Lambs died within the first week of life of **joint and navel ill** on two properties near **Vanrhynsdorp**. A few that survived showed severely swollen forelimb joints. The surviving lambs were treated with antibiotics and anti-inflammatories and the farmers were advised to move the ewes still to lamb to another part of the farm.

Four roan antelope were found dead on a farm in the Prince Albert area. A necropsy of one of the dead roan showed oedema in almost all organs. Tests were done for bluetongue, bovine ephemeral fever and African horse sickness viruses, but all were negative.

Large numbers of sick and dying Egyptian geese were reported from a farm near Porterville. Carcasses were collected from the farm dams for investigation. The geese tested negative for avian influenza and Newcastle disease, and non-specific signs were seen during necropsy.

Deaths of almost all (67/80) chickens belonging to a farmer near Bredasdorp died after showing weakness, diarrhea and pus in the eyes over several months. The chickens tested negative for avian influenza and Newcastle disease. No definitive diagnosis could be made.

Figure 10: Wool loss as a result of sheep scab (photo: M. Fourie)

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
June 2021
Volume 13 Issue 6

Highly pathogenic avian influenza (H5N1) update

Laura Roberts

By the end of June, 40 outbreaks of H5N1 highly pathogenic avian influenza (HPAI) had been detected in poultry in South Africa, and have been reported by the National Department of Agriculture, Land Reform and Rural Development (DALRRD) to the World Organisation for Animal Health (OIE). Fourteen of these outbreaks were reported from June: four in the Eastern Cape, two in Gauteng, one in North West, one in Kwazulu-Natal and six in the Western Cape (Fig. 1).

The poultry (as defined by the OIE) outbreaks in the Western Cape comprised:

- one commercial layer operation (outbreak onset 5 June)
- two in backyard chickens (latest outbreak 28 June)
- three in commercial ostriches

In the third ostrich outbreak, the mortality rate rose in June but positive laboratory results were only received in July. There were also significant mortalities and post-mortem indications of viraemia, including petechial haemorrhages, on one of the other affected properties. The virus was detected by PCR on all three affected properties.

The losses in commercial chickens in the Western Cape are estimated to be just over a million birds that died or were culled. This translates to a loss of approximately 17% of the layer chickens and 11% of the broiler breeder chickens in the province.

Non-poultry cases in the Western Cape included an

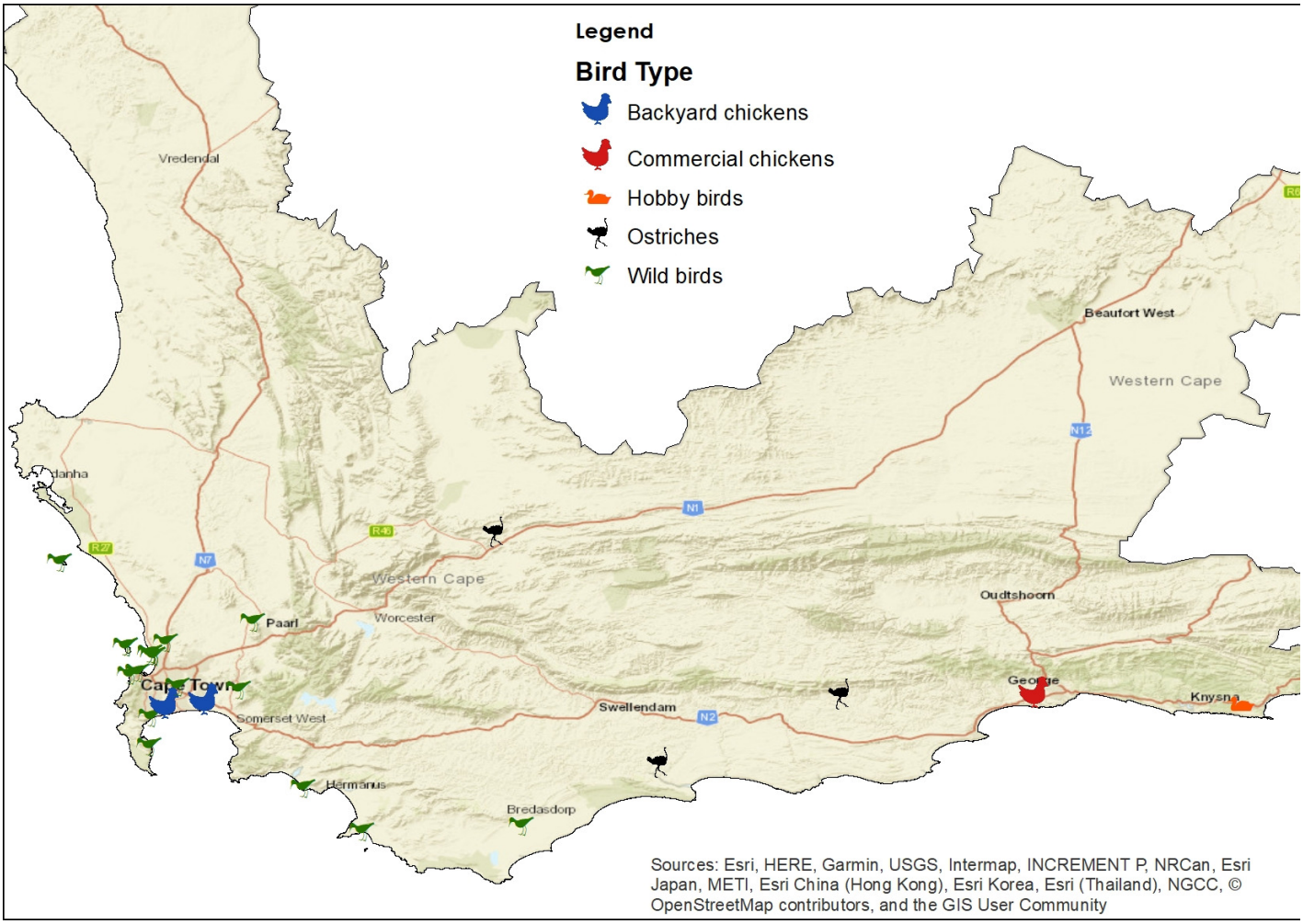

Figure 1: Approximate locations of outbreaks of confirmed and suspect H5 highly pathogenic avian influenza in the Western Cape in June 2021

outbreak in black swans, among birds kept as a hobby, and detections in wild birds at 13 sites. The latest wild bird case was reported on 30 June, in a great white pelican from Cape Town International Airport. Only two non-poultry cases were reported from outside the province: a pink-backed pelican from a zoo in Gauteng and swans from the Eastern Cape. Table 1 shows the total number of wild birds of different species that have tested positive for HPAI in the Western Cape in 2021.

Figure 2 shows the epidemic curve and contribution of different bird types.

Table 1: Wild bird species testing positive for HPAI (H5N1) in the Western Cape in 2021
(species and numbers in bold tested positive in June)

Species	No.	Species	No.
Blue crane	**1**	**Yellow-billed duck**	**1**
Great white pelican	4 **(3)**	Grey headed gull	1
Egyptian goose	1	**African fish eagle**	**1**
Spur-winged goose	1	African penguin	1
Kelp gull	6 **(5)**	**Brown skua**	**1**
Hartlaub's gull	11 **(4)**	**African sacred ibis**	**1**

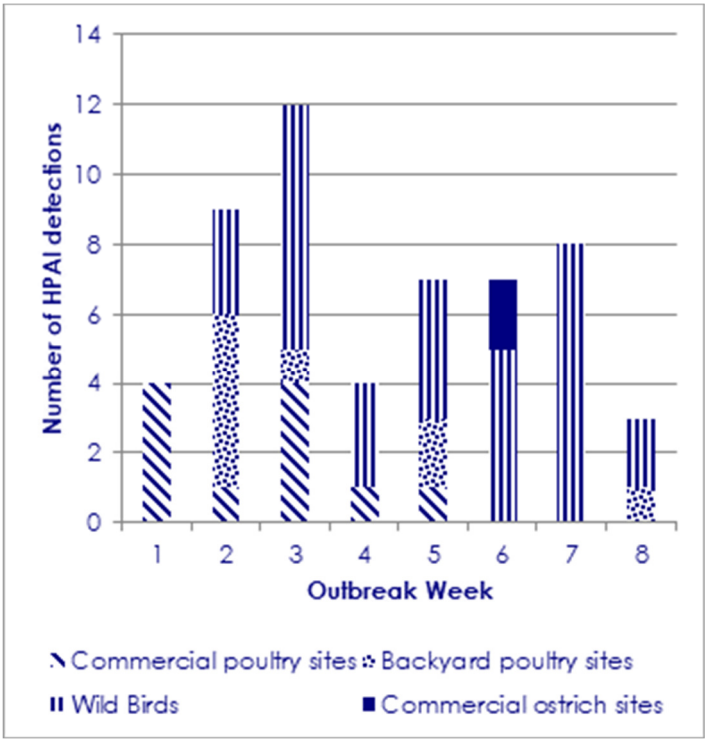

Figure 2: Western Cape HPAI (H5N1) epidemic curve (4 May- 30 June 2021)

Foot and mouth disease outbreak in KwaZulu-Natal

On 27 May 2021, clinical signs of foot and mouth disease (FMD) were seen by Veterinary Services officials during routine inspection of cattle at a dip tank in the Mtubatuba Local Municipality, KwaZulu-Natal (KZN).

Extensive tracing and surveillance was done after the detection of the first outbreak and, by the end of June, 17 more locations tested positive (Fig. 3). Cattle at some locations showed classical signs of FMD and were asymptomatic at others.

The majority of affected locations are dip tanks in communal grazing areas. One feedlot has also been confirmed infected. All of the positive locations are within the FMD Free Zone of South Africa. South Africa's FMD free status in this zone has been suspended since January 2019 after previous outbreaks of FMD in 2018.

A disease management area has been declared in KZN with movement restrictions on cloven-hoofed animals and their products.

The source and extent of the outbreak are still under investigation. The virus has been identified as a SAT 2 serotype that is most closely related to a virus that caused an outbreak in the Protection Zone of northern Limpopo in 2019.

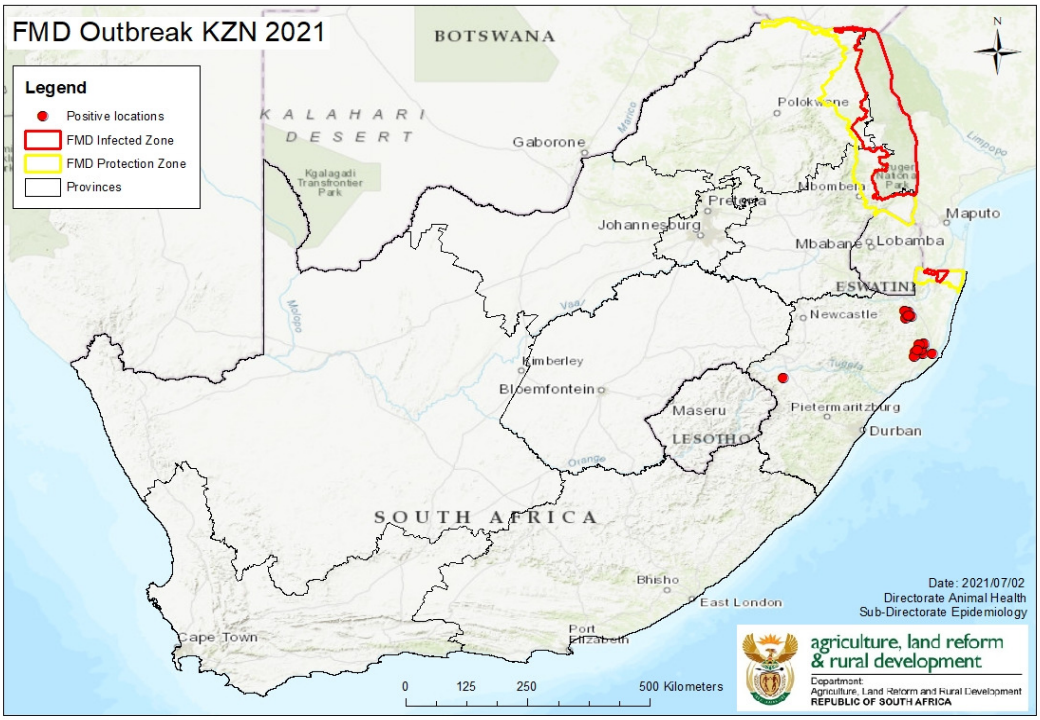

Figure 3: Foot and mouth disease positive locations in South Africa as of 2 July 2021. Map courtesy of DALRRD

Outbreak events

Cases of **highly pathogenic avian influenza** that occurred in June are detailed on pages 1 and 2 of this report.

An outbreak of **African swine fever** was reported in **pigs** belonging to small farmers in the **Kraaifontein** area of Cape Town. Several farmers experienced abnormal mortalities in their pigs after the pigs showed a lack of appetite and redness of the skin on the abdomen and hind legs. It is suspected that one of the farmers in the area introduced pigs from Mfuleni, where there is an ongoing outbreak of African swine fever.

Cattle kept near **Stellenbosch** tested positive for **brucellosis** after two cows aborted. The source of the disease is unknown as the owner is a speculator who buys cattle from multiple sources at auctions. A second herd of cattle belonging to a different owner is kept on the same property and the two herds share a crush facility. The property has been placed under quarantine and the two positive cows will be slaughtered. The farmers will decide how to proceed after the next round of testing of both herds.

Four cases of **rabies** were reported in June, with all cases being confirmed positive by laboratory testing:

⇒ A feral **cat** attacked a farmer near **Loxton,** fixing its teeth into her boot. The cat was killed by farm staff without anyone being bitten or having contact with saliva. The farmer planned to catch and euthanase the other two feral cats on the farm, and animals on neighbouring farms were vaccinated against rabies.

⇒ An **aardwolf** (Fig. 4) near **Murraysburg** attacked farm dogs and bit one of them. The dogs had previously been vaccinated against rabies and were revaccinated. The dog that was bitten will be kept in quarantine for six months and observed for any clinical signs of rabies.

⇒ A **bat-eared fox** seen on a farm near **Witsand** appeared lethargic and unable to move. It was shot by the farmer. Dogs and cats on the surrounding farms and in the town of Witsand were vaccinated in response.

Figure 4: Aardwolf (*Proteles cristatus*) (Photo: D. Käuferle)

⇒ A farmer near **Leeu-Gamka** found a dead **bat-eared fox** outside his yard. The farm dog had been previously vaccinated against rabies and was revaccinated in response.

Several outbreaks of **sheep scab** were reported in the province:

⇒ A farm near **Heidelberg** received a batch of ewes in November 2020 and distributed them amongst five farms in the area. In June, sheep scab was detected in one of the flocks by a private veterinarian. The sheep on all five farms were treated three times under official supervision. In the surrounding area, 58 farms were inspected and no evidence of sheep scab was found in any other flocks.

⇒ Another outbreak of sheep scab affected two farms in the north of the province near **Kliprand** (Fig. 5). Sheep had been bought in from the Wellington area and moved between the two farms. The farmer had treated the sheep for red lice several months previously, after they had been diagnosed by a pharmaceutical representative. The sheep on both farms were treated twice under official supervision.

⇒ A farmer near **Darling** reported wool loss to a private veterinarian, who diagnosed sheep scab. The neighbouring farm had been affected by sheep scab earlier this year. All sheep were treated twice under official supervision.

⇒ Scratching and wool loss was noticed in sheep on a farm near **Wellington** in May. The farmer notified the private veterinarian, who advised injectable and pour-on treatments without success. When the problem was reported to the state veterinarian more than a month later, sheep scab was diagnosed and the sheep were treated under official supervision.

Figure 5: Sheep showing lesions of sheep scab (photo: J. Kotzé)

A farmer in the **Hopefield** area had noticed a few **sheep** in his flock becoming emaciated and dying over the last three to four years. After taking a private vet's advice to sacrifice two sheep for necropsies, **Johne's disease** was diagnosed. The farm was placed under quarantine.

Increased mortalities were seen in **layer pullets** on a farm near **Paarl**. Necrotic liver lesions were seen during necropsies and samples taken tested positive for ***Salmonella gallinarum***. The chickens were placed under quarantine and a further action plan is being drawn up between the state and private vets involved.

Salmonella enteritidis was found on routine samples taken from 18-day-old **broilers** on a farm near **Worcester**. The chickens were treated with antibiotics.

Wild **laughing doves** were found dying in a suburb of **Cape Town** after showing puffed-up feathers. Samples taken from the doves tested PCR positive for both virulent Newcastle disease and **pigeon paramyxovirus**.

Erysipelas of swine was reported on two farms in the **Swellendam** area after skin lesions were identified in pigs after slaughter. One of the farms had previously reported erysipelas in May.

An **ostrich** farm near **Albertinia** tested **avian influenza** seropositive on a slaughter test. No clinical signs or mortalities were observed. Three rounds of follow-up sampling at an intensified sampling rate were done in May and June. All PCR tests were negative and, though one or two birds were seropositive each time, HI tests failed to indicate a H5, H7 or H6 avian influenza infection.

Lumpy skin disease was reported on five farms around **Ceres**. Reported morbidity rate ranged from 4 to 40% in affected herds. Affected **cattle** were treated with anti-inflammatories and antibiotics.

A case of **equine encephalosis** (EEV) occurred on a farm near **Clanwilliam**. Cases of EEV were reported from this farm in April and May as well.

Pasteurellosis caused mortalities in **lambs** in the **Vanrhynsdorp** area. Affected lambs showed signs of listlessness and heavy breathing before dying.

Infestations of **sheep** with **lice** were diagnosed in flocks near **Paarl** and **Heidelberg**.

Suspect cases of African swine fever were reported where **pigs** died in **Klapmuts**. The cause of death was determined to be **water deprivation**. In **Darling**, deaths of pigs occurred as a result of **sand impaction**. Another pig that died in **Kraaifontein** was found to have **pneumonia** caused by *Streptococcus* bacteria.

Suspect cases of avian influenza were investigated in **chickens** in **Atlantis.** Young chicks died as a result of **early starve-outs** and 20 broiler breeders were diagnosed with acute **septicaemia** after which they had a good response to antibiotic treatment.

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

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African swine fever update

Lesley van Helden

African swine fever (ASF) was detected at four more locations in July, bringing the total areas with active outbreaks in the Western Cape to eight. The majority of the affected areas are on the outskirts of the City of Cape Town, where smallholder farmers keep pigs informally, often free-roaming and in close contact with pigs belonging to other owners. Swill feeding and illegal slaughter is common. The source of the outbreaks is difficult to determine as many farmers either do not know or are not willing to divulge the origin of pigs they buy.

Affected areas include:

Khayelitsha (Mfuleni): outbreak started in early February 2021. Sporadic deaths of pigs are still occurring in the area. After biosecurity training by the Khayelitsha AHTs and seeing the example set by another farmer, several farmers whose pigs were culled have joined together to form a biosecure, enclosed area in which to farm in the future.

Saldanha: outbreak began in mid-April 2021. Most pigs in the area died but no deaths have been reported for a while. The Malmesbury state vet office has been monitoring the situation and hopes to be able to lift quarantine soon.

Strand: outbreak began in early May 2021.

Kraaifontein (Wallacedene): outbreak began in late June 2021.

Klapmuts: outbreak began in mid-July 2021.

Fisantekraal: outbreak began in mid-July 2021.

Khayelitsha (Wetlands): outbreak began in mid-July 2021.

Khayelitsha (Makhaza): outbreak began in late July 2021.

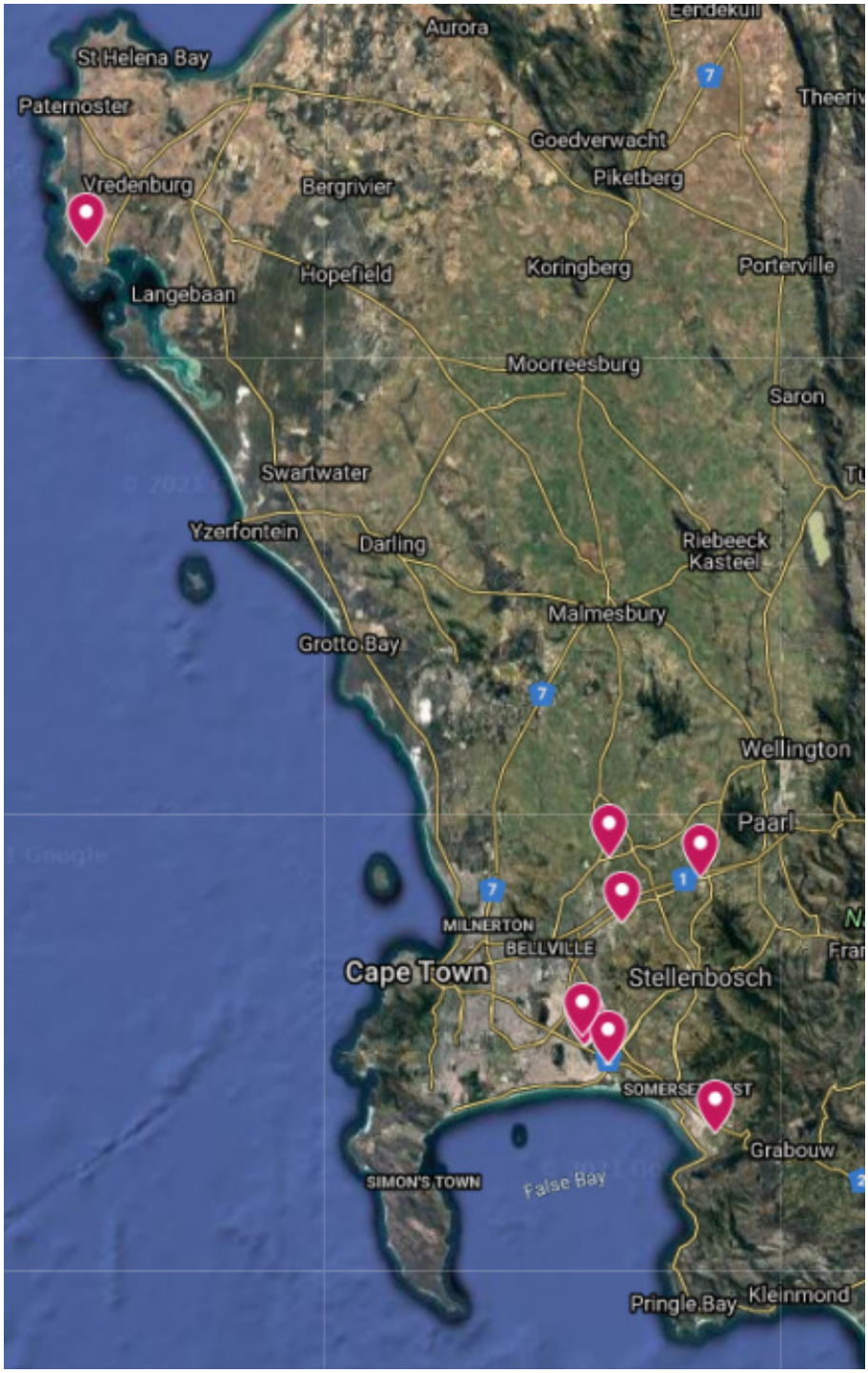

Figure 1: Locations of outbreaks of confirmed African swine fever in the Western Cape as of the end of July 2021. Outbreaks are indicated by magenta pins.

African horse sickness movements 2020 report

Adapted from the African horse sickness control: Movement report 2020 by J.D. Grewar[1] and C.T. Weyer[1]
[1] South African Equine Health and Protocols NPC

Introduction

This is the third detailed report on equid movements in South Africa with respect to controls implemented to mitigate the risk of African horse sickness virus (AHSV) entering the AHS controlled area of the country. The period evaluated is the 2020 calendar year. We differentiate between movements from the infected part of South Africa and those that occur within the AHS controlled area, the latter only where movements occur to a zone of higher control. Wild equid movements are also evaluated, as well as those stepwise movements that required a stopover quarantine period prior to entry into the AHS controlled area.

Permit based movements – infected zone to AHS controlled area

This section deals with any equid moving from the AHS infected part of South Africa directly into the AHS controlled area in the Western Cape Province. Movements from the infected zone require an AHS risk status classification which is reported by the State veterinarian (SV) of origin in the form of an area status declaration (ASD).

Domestic equids

A total of 1323 movement events consisting of 2692 domestic equids, all horses except for two donkeys, occurred in 2020, with an average of two equids moving per movement application. 53.8% of horses moved were Thoroughbreds. The remaining movements were evenly spread across breeds with the only other pure breeds moving relatively frequently being the American Saddlebred (7.5%), SA Warmbloods (6.8%), Hackneys (5.3%) and Arabians (4.5%).

Figure 2 shows the time series analysis of domestic equids moved. The impact of the national COVID-19 lockdown is clear with a standstill on movement for the whole of April and a recovery to 2019 levels only by November. Most equids moved between September and December 2020, although the February peak of over 400 animals was the highest monthly total for the year. The AHS surveillance zone (SZ) remained the most common destination (63.3%) for equids moved. Year-on-year there was a 34% and 39% decrease in the number of movement applications and total domestic equids moved, respectively.

Figure 3 gives an indication of the primary origin of equids moving into the AHS controlled area. In this case, the movement has been categorized by the state veterinary area of origin. These areas are specifically labelled if 100 or more equids moved from that region during the year. The main province of origin was the Western Cape Province, with the George, Beaufort West, and Swellendam state veterinary areas most represented. These three areas of origin accounted for 44% of all equids moved from the infected area during the year. The racing/training jurisdictions in the Free State (Kimberley), Kwa-Zulu Natal (Umgungundlovu and Ethekwini), Gauteng (Germiston) and Eastern Cape (Port Elizabeth) were most represented outside of the Western Cape. The eight labelled areas in Figure 3 accounted for a total of 81% of all domestic equids moved during the year. Like the temporal trend, the spatial point of origin of equids entering the controlled area did not differ much from previous analysis, although the numbers originating in each area were substantially lower.

Stop-over quarantine (SOQ) movements

A total of eight SOQ facilities were used during 2020, two of which are in the AHS controlled area itself. These two, along with the Gauteng facilities, are vector protected facilities. 110 horses moved under this protocol, compared to 319 for 2019, a 65% decrease. Seven (6.3% compared to 11% in 2019) horses travelled through the two facilities that were in the controlled area. All stop-over facilities used in 2020 were within the Western Cape except for the Gauteng vector proof facilities. The primary destination of these movements is the surveillance zone, mirroring the general movement trend.

Wild equids

A total of 34 zebra were moved within or from the AHS controlled area during 2020, compared to 26 in 2019. All were Burchell's zebra (*Equus burchelli*). All movements were either in the same AHS controlled zone or into a zone of less control. No animals moved from the infected zone into the AHS controlled area.

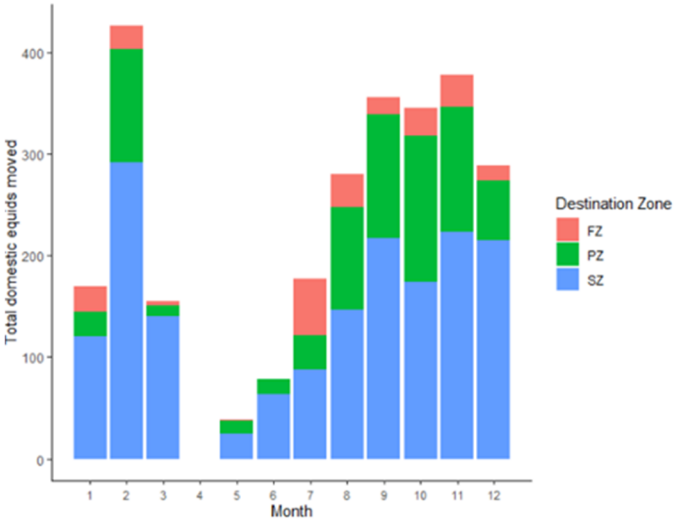

Figure 2: Time series plot of total domestic equids moved and their destination within the AHS controlled area during 2020

As in the previous analyses zebra generally move during the colder winter months.

Pre-notification only based movements - within controlled area

Within AHS control area movements to a zone of higher control requires that notification of movement occurs within 72 hours of movement. A total of 2860 equids moved in this fashion during the year, down from 3939 in 2019, an 27% decrease. Most equids that moved within the controlled area were Thoroughbreds (80.1%). Most (74%) moved from the AHS protection zone (PZ) to the AHS surveillance zone.

An important consideration for these movements is that there are a considerable number of horses that move from the AHS surveillance zone into the AHS free zone (FZ) on the multiple movement permit system, which is a same day return movement licensing system allowing horses to move in this fashion without pre-notification of movement. The information reported here refers to movements where horses would generally not be returning on the same day.

The movement pattern over time is quite like that of infected area origin movements. The movements from the protection zone into the free zone in January 2020 were again primarily associated with a Thoroughbred sale which was held at the CTICC. Generally, the movements between the surveillance and free zone throughout the year will either be equids moving to one of the two veterinary practices that have their premises within the free zone or thoroughbreds in training that move from feeder farms in the controlled area to the training yards in Milnerton.

Discussion

A total of 5552 equids moved into a zone of higher control during the year, a 33% decrease from 2019 – this almost certainly because of COVID restrictions implemented in early 2020. Once again it is clear that most movements into a zone of higher control consisted of domestic equids and, while it is important to understand wild equid movements, the risk mitigation of AHS spread into the AHS controlled area through domestic equid control remains crucial. The AHS surveillance zone remains the most common zone of destination, both for infected area origin and controlled area origin movements. Most movements are associated with Thoroughbred horses, and this breed drives the high areas of origin of the various racing centers in the country and the use of stop-over facilities in the Karoo.

Movement regulation requires close communication and interaction between various regulatory and State authorities. Movements originated from 47 of the 126 State vet areas in the country; although only 20 SV areas had more than 10 equids move from them during the year.

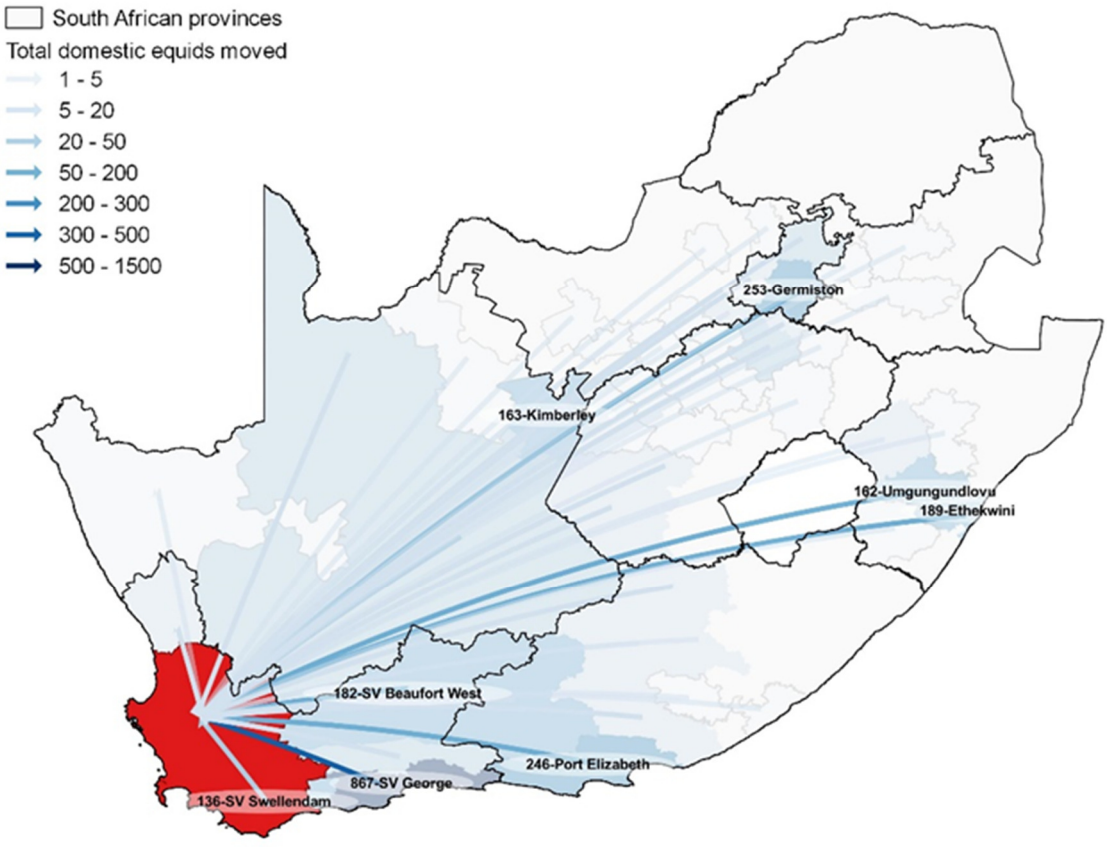

Figure 3: The total number of equids per State veterinary (SV) area of origin that moved into the AHS controlled area in 2020. Areas are labelled if 100 or more equids moved from the region during the year. Note the Swellendam SV area intersects the AHS controlled area – movements in this case are only from the AHS infected area of that SV area.

Stop-over quarantine movements have assisted in facilitating the movement of 110 horses that would otherwise not have moved or would have required a 40-day residency in an AHS low risk area prior to direct movement. While this system is expensive and intensive it promotes the movement of high value horses or critical movements (such as high-level competition) and allows control and an acceptable system for the public needing to move horses.

AHS outbreak resolved

As of 6 July 2021, no cases of African horse sickness had been reported from within the protection zone for more than 40 days. The outbreak in the Cederberg Local Municipality near Clanwilliam that began in April 2021 was therefore declared resolved and movement controls put in place as a result of the outbreak were lifted.

Outbreak events

Outbreaks of **African swine fever** were detected in four more areas in the City of **Cape Town** in July. More details are provided on page 1 of this report.

Highly pathogenic avian influenza (HPAI) H5 was reported in **ostriches** from the **de Rust** area. **HPAI H5N1** was also detected in a dead **great white pelican** from False Bay Nature Reserve, **Cape Town** at the beginning of July. The bird had a secondary bacterial pneumonia. Two **kelp gulls,** from Camp's bay (H5 negative) and Bloubergstrand (H5 positive) were AI positive near the end of the month. Both showed neurological signs.

Exposure to **LPAI H5N2,** based on serology, is suspected in **ostriches** in the **Riversdale** area. They are 12 and 9km, respectively, from a farm where LPAI H5N2 was sequenced in May.

Undefined avian influenza was reported from an **ostrich** farm near **Witsand**. Inconsistent serology in only one bird makes the diagnosis difficult. Similar situations have been experienced on two farms in the Riversdale area with only one bird seropositive at each test and no evidence of disease spread.

Johne's disease was confirmed in two **sheep** flocks near **Moorreesburg and Darling** after the owners noticed a small number of sheep losing weight over a long period of time.

Erysipelas of swine was diagnosed after slaughter on pig carcasses from two farms from the **Swellendam** area.

On a property near **Oudtshoorn**, **domestic show pigeons** bought from Roodepoort started showing nervous signs, depression and a high mortality rate a few days after arrival. Test results were PCR positive for Newcastle disease, but further typing results are not yet available. The cause of the outbreak is suspected to be **pigeon paramyxovirus**. The owner has vaccinated all pigeons and poultry on the property in response to the outbreak.

Wild **rock pigeons** and **laughing doves** were found dead in **Swellendam**, **Porterville** and on a farm near **Piketberg**. Birds from all three locations tested positive for **pigeon paramyxovirus**.

Approximately 300 five-day-old **broiler chicks** died shortly after arrival on a chicken farm near **Paarl**. An **avirulent strain of Newcastle disease** was identified in samples taken.

A smallholder farmer near **Malmesbury** lost 25% of her **chickens** after they began showing nervous signs. The birds were found be infected with **avirulent Newcastle disease**.

A batch of **sheep**, later discovered to be infested with sheep scab, were bought and divided amongst four farms belonging to the same owner in the **Heidelberg** area. All sheep flocks on the farms were treated twice under official supervision.

A **heifer** near **Groot Brakrivier** became blind, stopped eating and died shortly thereafter. The neighbouring farm keeps wildebeest, and the cause of death was found to be wildebeest-associated **bovine malignant catarrhal fever**.

Lumpy skin disease was reported in **cattle** herds near **Ceres, Touws River and Villiersdorp**. Characteristic bumps were seen under the skin of unvaccinated animals.

Cases of **bluetongue in sheep** were reported by a farmer near **Klaarstroom**. Affected sheep were treated with antibiotics and anti-inflammatories.

Pneumonia was seen in a **lamb** that died in the **Murraysburg** area.

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

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Canine rabies cases in the City of Cape Town

Lesley van Helden

Two cases of rabies were reported in August in dogs in the suburb of Mandela Park, Khayelitsha, in Cape Town. Both dogs were kept in enclosed yards in houses within 500m of each other, but there is no known link between the cases.

Rabies has not been reported from the City of Cape Town in any species of animal since an isolated case that was recorded in 1994. However, large outbreaks in dogs are ongoing elsewhere in South Africa, most notably in Nelson Mandela Bay and all along the coastal areas of the Eastern Cape and KwaZulu-Natal between Buffalo City and uMfolozi, including in Port St Johns, uMhlathuze (Richards Bay) and Durban and surrounding towns. There is therefore a risk of introduction of a rabid dog into Cape Town from these areas.

The first dog, a one year old male, was brought to a veterinary clinic in Khayelitsha on 9 August 2021 showing weakness, vomiting, lower jaw paralysis, an open mouth and the appearance of choking. The owner reported that the dog had previously been aggressive but had suddenly become tame. The dog was euthanased and tested positive for rabies. The owner and family members who had contact with the dog were referred to local health care facilities where they received appropriate post exposure prophylaxis.

On 12 August 2021, another dog was brought to the same clinic showing salivation and incoordination. The dog was euthanased and also tested rabies positive. The owner apparently travels frequently to the Eastern Cape and is believed to use his dogs for hunting.

In the weeks following the two cases, no more rabid dogs were detected or reported in Cape Town, despite testing of all cases in the area that showed suspicious neurological signs.

Khayelitsha is a large area of Cape Town in which rabies vaccinations are routinely done by animal health technicians (Fig. 1) as well as local animal welfare organisations. Records specifically from Mandela Park show that in the last five years just under 4000 rabies vaccines were provided for pets by Veterinary Services. In 2020, 1686 pets were vaccinated in the area and another 420 rabies vaccinations were done in the first quarter of 2021.

In response to the rabies cases, a door-to-door vaccination campaign was done in Mandela Park, with animal health technicians vaccinating every animal presented to them. 1688 dogs and ten cats were vaccinated in two weeks. It is assumed that this represents a fairly accurate estimate of the number of pets in Mandela Park and that vaccination coverage in the area in the past has therefore been good. Western Cape Animal Health aims to keep rabies vaccination coverage as high as possible in the province, especially in areas that are at higher risk of rabies introduction. These include areas with high population density, high levels of movement of people and a of lack of access to private veterinary services.

There is currently no indication that rabies is circulating in dogs in Cape Town (or in dogs anywhere else in the Western Cape) but cases may occur in future if dogs carrying rabies are introduced from other parts of the country. Veterinarians and paraveterinarians are therefore urged to remain vigilant for animals displaying unexplained neurological signs and death.

Figure 1: Western Cape Veterinary Services officials doing routine rabies vaccination of dogs (Photos: D. Johnson and T. du Plessis)

African swine fever update

As of 31 August 2021, 14 outbreaks of African swine fever (ASF) were confirmed and still ongoing in the Western Cape (Fig. 3).

Eight new outbreaks began in August, in Grabouw, Mbekweni (Wellington), Zwelethemba (Worcester), Zolani (Ashton), Klapmuts (Fig. 2), Silwerstroom, Khayelitsha and Kuilsriver.

All affected locations are areas where multiple smallholder farmers are keeping livestock on municipal land with few to no biosecurity measures in place between herds.

Those keeping pigs are advised to be vigilant and assume that there is a risk of ASF in pigs from all areas in the province and country. Pigs should be bought only from healthy herds with good biosecurity measures in place.

Figure 2: A pig in Klapmuts showing clinical signs of ASF (Photo: M. Fourie)

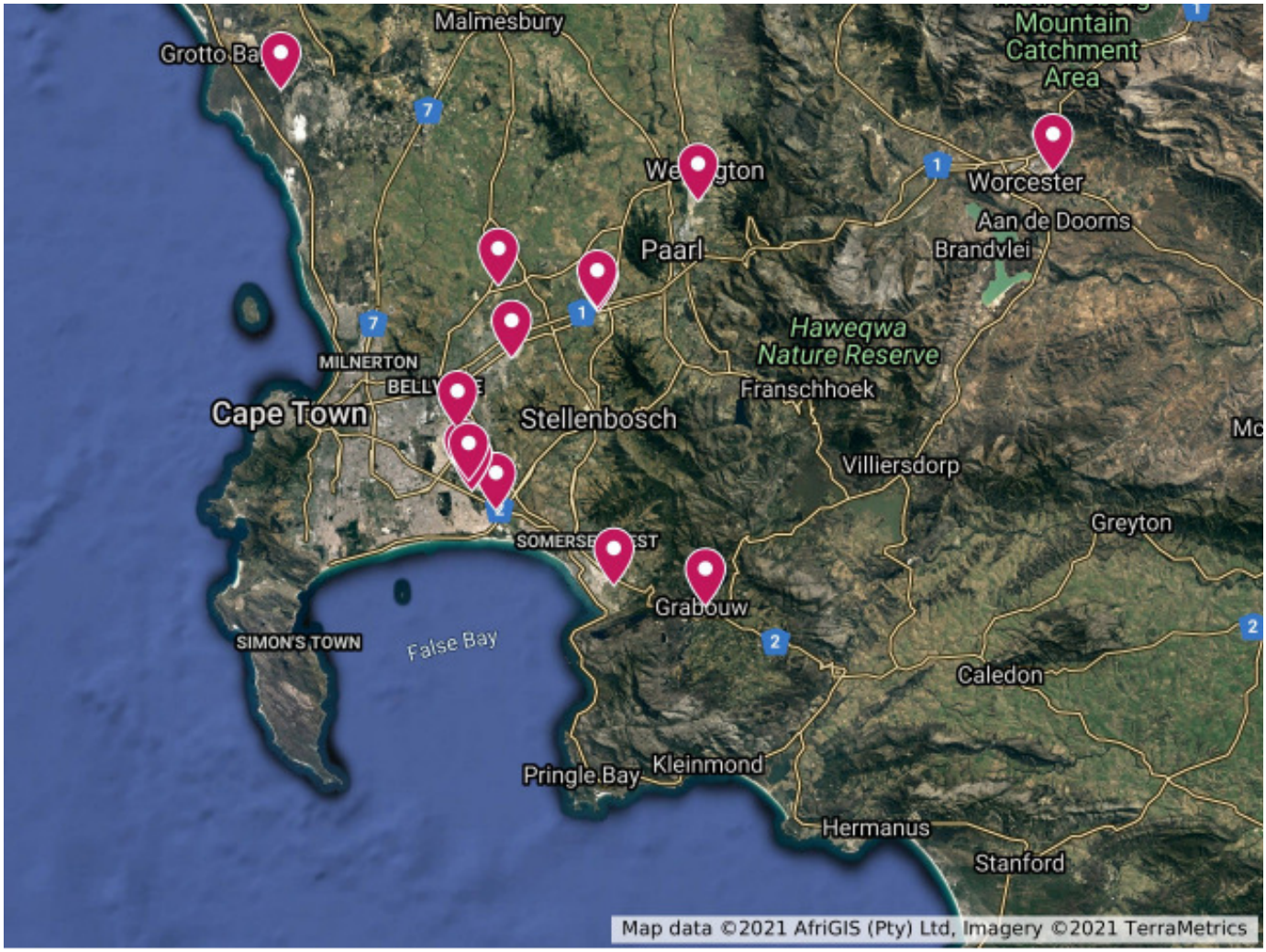

Figure 3: Locations of active outbreaks of confirmed African swine fever in the Western Cape as of 31 August 2021. Outbreaks are indicated by magenta pins.

Outbreak events

Outbreaks of **African swine fever** were detected in eight more areas in the Western Cape in August. More details are provided on page 2 of this report.

The details of two cases of **rabies** that were reported in **dogs** in **Cape Town** are on page 1. Cases of confirmed and suspect rabies in other species also occurred in the province in August:

⇒ A **bat-eared fox** was found on a dairy farm near **Stanford** showing muscle tremors and unnatural tameness. The fox was euthanased by a private veterinarian and tested positive for rabies. During an investigation on the farm, the local state veterinarian found remains of several dead bat-eared foxes. It is suspected that there was an outbreak of rabies affecting an entire family group.

⇒ An **aardwolf** on a farm near **Murrayburg** was killed after it attacked two dogs. The aardwolf's brain tested positive for rabies. The two in-contact dogs were euthanased.

⇒ A cow near Swellendam showed classical signs of rabies, appearing depressed and aggressive, salivating excessively and having trouble swallowing. The cow died the next day and a brain sample was collected, but tested negative for rabies.

A free-range **chicken** farm in the **Cape Town** area was infected with **highly pathogenic avian influenza** (HPAI) in early August. All 6500 chickens were culled and buried.

There have continued to be **H5 avian influenza** virus (presumed HPAI) detections in wild coastal birds. Most were gulls: three **Hartlaub's gulls** and a **kelp gull** from around Cape Town, and one was an **African penguin** chick from Simon's Town that was found dead. The gulls showed neurological signs including weakness and head and body twitches.

Undefined avian influenza virus (AIV) was detected in one of two dead **turkeys** in the **Cape Town** area in late August. H5, H7 and H6 AIV PCR tests were negative. Postmortem findings suggest that death may have been due to a concurrent pulmonary infection with another pathogen. The 80 chickens on the property remained healthy.

A farmer near **Oudtshoorn** experienced problems with his sheep itching and scratching since May 2021. After treating the sheep unsuccessfully for red lice, he contacted the local animal health technician, who took samples in which **sheep scab** mites (*Psoroptes ovis*) were seen. All sheep were treated twice under official supervision with doramectin.

In the **Prince Albert** area, scaly skins, crusting and severe wool loss was reported from a flock of **sheep** (Fig. 4). The sheep did not show typical signs of itching, but were biting each other's fleeces, resulting in some sheep dying of exposure from wool loss during cold nights. Skin scrapings showed no sheep scab mites. A diagnosis of **dermatophilosis** was made.

Figure 4: Sheep affected by dermatophilosis in the Prince Albert area (Photos: M Brand)

Skin lesions caused by **erysipelas of swine** were seen after slaughter on one pig carcass of a batch of 51 from a farm near **Eendekuil**.

Abortions occurred in 20 **Angora does** in a flock of 250 in the Karoo north of **Laingsburg**. Samples tested positive for *Chlamydia* causing **enzootic abortion**.

Near **Murraysburg**, 12 **lambs** died suddenly in a feedlot after showing signs of abdominal pain. After treatment with tetracycline, clinical improvement was seen and deaths stopped within 24 hours. A diagnosis of redgut caused by ***Clostridium perfringens*** was made on post-mortem, during which haemorrhagic enteritis and bloody fluid in the abdominal cavity was observed.

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EPIDEMIOLOGY REPORT

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Highly pathogenic avian influenza in Cape cormorants September/October 2021

Laura Roberts

Clade 2.3.4.4 H5N1 highly pathogenic avian influenza (HPAI) was detected in South Africa in April and in the Western Cape in May 2021. By 12 October, 60 outbreaks in poultry (including ostriches) had been reported to the World Organisation for Animal Health (OIE), 23 of which were in the Western Cape. Most of these detections in our province occurred in May and June and one each in July, August and September.

Cases in **wild birds,** especially coastal birds, seemed to be following a similar epidemic curve to poultry. The predominant species affected initially in May and June appeared to be Hartlaub's and kelp gulls and there were 5 positive great white pelicans, one from a site with an estimated 40% mortality rate. Few HPAI detections occurred in July and August, though suspect cases were seen regularly in gulls.

Retrospectively, two tame **Cape cormorants** (fig. 1 and 2) from Velddrif and Scarborough in the first week of September may have been infected, but the first ones sampled were found on 13 September in Velddrif and were confirmed to be infected with H5 HPAI. There were concurrent small numbers of suspect and confirmed cases from Dassen Island, near Yzerfontein and from southern coastal suburbs in Cape Town.

In **Velddrif,** until about 10 October, suspected cases were reported regularly, but in small numbers (total approximately 20). The numbers then increased suddenly and 1600 were collected on 12 October at the Royal Salt Works. Approximately 100 have been found daily, in the area, since, though the numbers appear to be decreasing. The total was at 2700 on 24 October.

Dyer Island, near Gansbaai, also had Cape cormorants with clinical signs of HPAI on 10 October and positive avian influenza virus test results on 15 October. Nearly 6000 dead and dying Cape cormorants were collected from the breeding colony over the first five days and approximately 500 were cleared every day for ten days, before the numbers dropped slightly to 300 per day. The total was at over 9000 on 24 October.

Other hotspots have included Heuningnes Estuary in De Mond Nature Reserve, where nearly 700 Cape cormorants have been found and Arniston and Betty's Bay, with over 100 each. However, sick and dead Cape cormorants have been reported from all along the coast from Lambert's Bay to Arniston in the last two weeks of October. Further positive tests have been received from Lambert's Bay, Robben Island, Simon's Town and Betty's

Figure 2: Adult Cape cormorant, identified by the yellow colouring around the beak (Photo: D. Daniels)

Figure 1: A sick juvenile Cape cormorant. Juveniles have no yellow colouring (Photo: Anon.)

Bay.

Cape cormorants, along with Cape gannets, African penguins and bank cormorants (fig. 3), are classified as **endangered species**. The South African population has halved since the early 1980s and only approximately 100 000 adult Cape cormorants remain. We have lost at least 10 000 birds in October, equating to approximately 10% of the adult population. The reason for the sudden increase in mortalities is not known, but is probably related to the aggregating of Cape cormorants for the peak breeding season. Bank cormorants are also of great concern. Only 5000 individuals are believed to remain and, given the similar appearance to Cape cormorants, their mortality rate may be underestimated.

Other species that have tested positive recently have included a white-breasted cormorant from Cape Town (25 total positive/suspect cases so far in October), Cape gannets (6 total suspect/positive cases) from Lambert's Bay and sacred ibises from Robben Island (approx. 15 cases). Thirty-eight African penguins had been counted as suspect cases by 26 October, mostly from Dyer Island and testing is in progress.

Clinical signs observed in the affected cormorants and other species have included unusually calm behaviour or tameness around humans and/or weakness, head twitches or tremors, disorientation, ataxia/incoordination and seizures. Treatment is deemed futile and can increase the risk to other susceptible birds. Euthanasia is therefore the humane and logical choice.

CapeNature and municipal environmental officials have been patrolling and collecting sick and dead birds for euthanasia and burial, in an attempt to lower the level of virus in the environment (fig. 4 and 5). Support has been provided by district municipalities, the Provincial

Figure 3: Bank cormorant: no yellow, larger than Cape and flat forehead (Photo: B. Dupont)

Disaster Management Centre and waste management authorities. Burial sites are positioned as close as possible to the affected sites and approved by waste management. Incineration has also been made possible by the generosity of medical waste and pet cremation services. Any carcasses requiring transport are packaged in multiple layers of plastic. Officials have been instructed to wear gloves and masks when handling affected birds and members of the public have been instructed not to touch sick and dead birds. Private vets have been assisting with euthanasia where available.

The majority of reporting is done via CapeNature, and seabird rehabilitation centres.

Figure 4: West Coast District Municipality staff collecting carcasses in Velddrif (Photo: C. Malherbe)

Figure 5: West Coast District Municipality staff loading carcasses to be transported to the burial site (Photo: C. Malherbe)

Outbreak events

A suburban **dog** from Gordon's Bay in **Cape Town** was taken to a private vet after it showed ataxia and aggression. It was euthanased and tested positive for **rabies**. The dog was ten years old and had last been vaccinated against rabies as a puppy. The owner reported that about two weeks previously, an aggressive dog had been wandering in the street and fought with his dogs through the fence. The in-contact dog on the same property had been recently vaccinated against rabies and was vaccinated again in response to the case. Rabies vaccination campaigns were done in Gordon's Bay in the following weeks and 1896 pets were vaccinated by Veterinary Services officials.

A small farmer in the Blue Downs area of **Cape Town** experienced deaths of **pigs** after they showed skin redness on various parts of the body and a loss of appetite. Samples taken from a pig carcass tested positive for **African swine fever**. The farmer was placed under quarantine, issued lime for disinfection and advised on biosecurity measures.

A commercial broiler breeder **chicken** farm near **Malmesbury** experienced an outbreak of **highly pathogenic H5 avian influenza** for the second time this year. The farm had been depopulated and disinfected and new parent stock placed. Increased mortalities started to occur from day 17 in two of the houses on the farm. The affected houses were culled and in-house composting is being done in an effort to control the outbreak.

An **ostrich** farm in the **de Rust** area tested **avian influenza** seropositive on a slaughter test. Two rounds of follow-up sampling, at the intensified rate, resulted in **H6** positive serology and PCR tests. On trace back, testing of four farms within 10km resulted in positive H6 PCR tests on a second ostrich farm, 10km away. The others three farms tested negative.

Three **African grey parrots** belonging to an exotic bird breeder near **Piketberg** died suddenly and subsequently tested positive for **psittacosis**. The farm was placed under quarantine and all birds treated with doxycycline for 45 days.

The carcass of one **pig** from a farm near **Eendekuil** was condemned after slaughter at the abattoir after skin lesions of **erysipelas** were seen by the meat inspector.

A **sheep** on a farm near **Vanrhynsdorp** died suddenly after the flock consumed a lick block. A post-mortem of the sheep showed signs of **copper toxicity** (fig. 6).

Six **goat** kids were found dead on a farm near **Malmesbury** shortly after the farmer had dosed all sheep and goats for internal parasites. It is suspected that the deaths were caused by **pulpy kidney**, and the farmer was advised to start a vaccination programme to prevent this in future.

Sudden deaths of pigs were investigated near Paarl, Heidelberg and De Doorns, but African swine fever was ruled out. Oedema disease or salt poisoning are suspected to be the cause of the deaths.

Suspect cases of rabies were investigated in a dog and a small grey mongoose in Swellendam, both showing abnormal behaviour and aggression. Test results were negative for rabies.

Figure 6: The kidney of a sheep that died of copper toxicity, showing characteristic blackening of the cortex (photo: J. Kotzé)

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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African horse sickness sentinel surveillance 2020/21

Adapted from the AHS Sentinel surveillance report: 2020-2021 season by J.D. Grewar[1] and C.T. Weyer[1]
[1] South African Equine Health and Protocols NPC

The African horse sickness (AHS) sentinel surveillance program provides additional confidence of AHS freedom in the AHS free (FZ) and surveillance zones (SZ) of South Africa. The program incorporates the monthly sampling of recruited horses proportionately selected within the zones based on the estimated underlying population. The program has two components – a sero-sentinel program that evaluates the changing serological status of horses on a month to month basis; and a PCR-based program that is used to detect the presence of AHS viral RNA within recruits. The sero-sentinel sampling target is drawn up to detect AHS at approximately a 5% minimum expected prevalence (with a 95% confidence level) whilst the PCR surveillance aims for a 2% minimum expected prevalence. Monthly sampling targets are therefore approximately 60 and 150 recruits, respectively. Individual recruits can be part of both programs. Sero-sentinels are required to be completely unvaccinated and are screened using serology prior to recruitment. Recruits used in the PCR-based program are required to be unvaccinated for at least the previous two years. The vaccination status of PCR sentinels does not influence their recruitment unless vaccination against AHS took place sufficiently recently

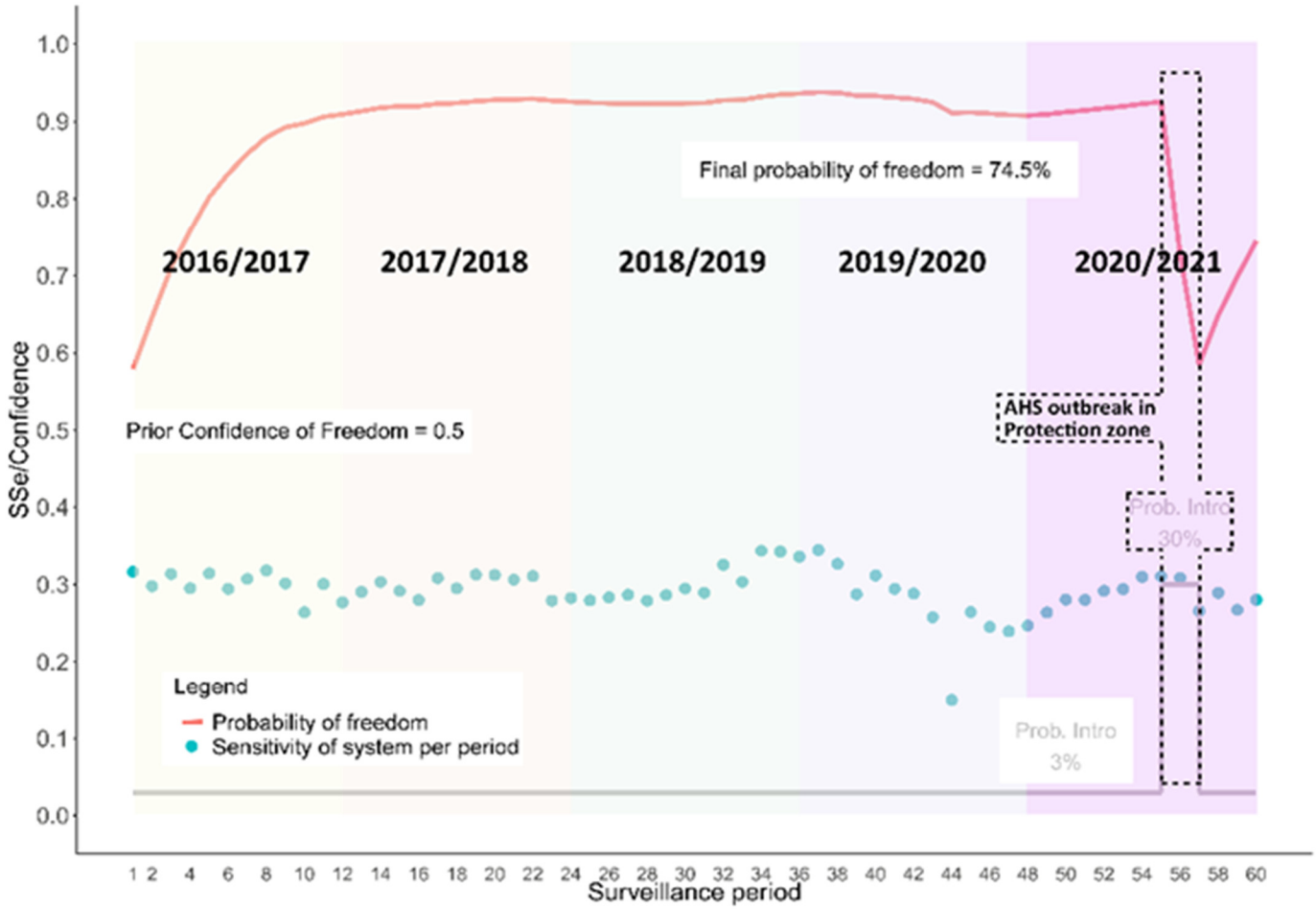

Figure 1: The sentinel surveillance sensitivity of individual surveillance periods (dots) with probability of freedom curve (red line) based on an uninformed 50% prior probability of freedom for the past five surveillance seasons: the season currently reviewed is the right pane – i.e. the 2020/2021 season running between Sept 2020 and Aug 2021. Probability of AHS introduction of 3% is set for periods where no AHS outbreaks are present in the AHS controlled area (grey line at 0.03 on y-axis) but at 10X that rate for where outbreaks are present as in April and May 2021 in the Cederberg AHS Protection zone.

to result in positive PCR results on initial testing.

The serological test performed is the indirect ELISA (Maree & Paweska 2005). It is a non-quantitative assay and changes across paired sample events are used for evaluation. Follow-up serological tests include the serum neutralisation test (SNT), which is AHS serotype specific. All serology was performed at the Agricultural Research Council - Onderstepoort Veterinary Research (ARC-OVR). Viral RNA testing was performed at the Stellenbosch Provincial Veterinary Laboratory (SPVL). The test method used is a University of Pretoria (Equine Research Center) developed and OIE validated real-time RT-PCR (Guthrie et al. 2013).

This report covers the 2020/2021 AHS season from 1 September 2020 to 31 August 2021. While an outbreak of AHS occurred in the AHS protection zone during the season, the results confirm that it is unlikely that AHS was circulating in the AHS free and surveillance zone during that period.

General overview of sampling and results

A total of 527 sero-sentinel samples were analysed from 30 different farms at an average of 44 samples from 23 different farms per month. This was a decrease of 12% from the 2019/2020 surveillance period for the sero-surveillance program. Of the tested serological samples: 513 (average of 43 per month) could be evaluated as they had relevant paired results.

A total of 1661 PCR sentinel samples were analysed from 72 different farms at an average of 138 samples from, on average, 52 different farms per month. This was a decrease of 5% from the previous season.

Results

The serology samples that could not be evaluated for lack of a paired sample totaled 14 samples (2.6% of the total, an increase from 2% the previous season).

All samples taken for the PCR-based surveillance tested negative.

As with the 2018/2019 and 2019/2020 seasons, there was one investigation of importance for the period reviewed – in this case it was a horse that went from a negative serological status to positive, suspect and negative (remaining so) over four months in early 2021. Based on the investigation the iELISA conversion is not likely to have arisen from circulating AHSV and this case was classified as negative and as an unspecified serological conversion.

Spatial considerations

The sentinel surveillance program is based on a proportional sampling system with most sentinels in areas of the surveillance area that have the highest population of horses. Figure 2 shows the underlying population.

The areas requiring most improvement remain Paarl and Philadelphia regions for serological sampling. Additionally in this season, sampling of the horses in the Mitchells Plain area was impacted due to security concerns. PCR sampling is relatively representative with the Paarl and Mitchells Plain regions requiring attention.

Surveillance system evaluation

The surveillance program is designed to detect AHS in the AHS surveillance zone at a minimum expected prevalence of 5% (serology) or 2% (PCR). The final probability of freedom at the end of the five-year period (60 months) was 74.5%, a drop of 16.8% from the previous evaluation (Figure 1).

The sensitivity of the sentinel surveillance alternates around the 30% mark throughout. This is the fifth AHS season running where cases of the disease have not been detected in the AHS surveillance and free area, although an outbreak of AHS occurred in the AHS protection zone (Figure 3).

Impact of the Cederberg AHS outbreak in the AHS Protection zone

While AHS was not detected in the AHS free and surveillance zones in the period reviewed, the outbreak in the controlled area impacts the final probability of freedom provided by the system since it is realistic to estimate that the probability of introduction of AHS into the AHS surveillance and free zones is increased during the outbreak period. The AHS outbreak occurred ~ 88km to the closest point in the AHS surveillance zone (Figure 3), although the highest density of horses in the surveillance zone is still further south than that point. Be that as it may, for the outbreak period we increased the probability of introduction to 10X the 3% generally used to provide some insight into the impact of AHS cases in relatively close proximity to the surveillance zone. The impact is clear to see in Figure 1 where the probability of freedom drops substantially in April and May of 2021 with recovery up to the final 74.5% in August 2021.

Discussion and Conclusion

The primary goal of demonstrating AHS freedom for the 2020/2021 AHS season was achieved. The PCR testing in conjunction with the serology testing assists greatly in the analysis of the system and for follow-up in suspect cases. All investigation reports are shared with Provincial and National Veterinary Services.

A five-year review of sentinel results show that the probability of freedom attained for this program, at an animal design prevalence of 5% and herd-level design prevalence of 2%, shows a 74.5% probability of freedom from AHS in the AHS surveillance and free zones. This level was achieved in the face of the AHS outbreak that occurred ~ 88km from the border of the AHS surveillance zone.

Spatial representativeness remains challenging, particularly in conjunction with continued COVID-19 related restrictions in April-June 2021. The target minimum prevalence of 5% has however been achieved through the use of EDTA sampling and PCR testing; the

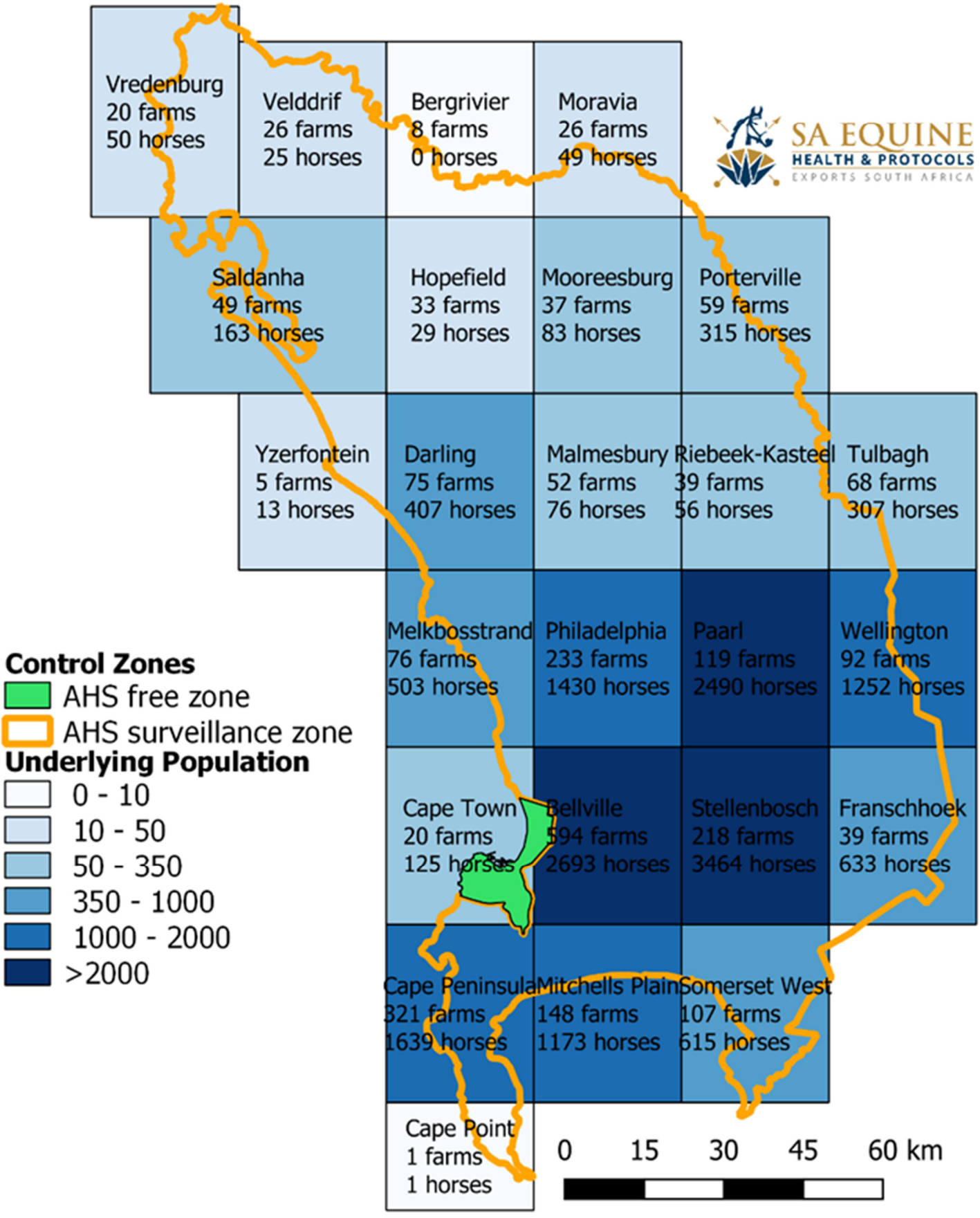

Figure 2: The underlying population of horses in the Surveillance and Free Zones of South Africa. These populations have been revised based on new population data collected between 1 April 2016 and 1 September 2021.

goal remains however to get as close to the 2% MEP level as often as possible.

References and acknowledgements

This program would not be possible without the support of the horse owners in the AHS surveillance zone who freely give of their time and resources to allow and facilitate the monthly sampling of horses. We are grateful to the Onderstepoort Veterinary Research Institute and the Stellenbosch Provincial Veterinary Laboratory who performed the testing of samples this season.

In this season we again made use of compulsory community service and Western Cape state vets who assisted in sampling. In this regard we specifically acknowledge Drs. Tasneem Anthony, Aliya Davids and Leandri Klopper. We are grateful to our SAEHP team who are directly involved with the program – Esthea Russouw and Lizel Germishuys.

The sentinel surveillance program costs in the region of R1.5 million a season. This cost is made up of testing, personnel, travel/logistics and equipment costs. Funding primarily comes from the South African Equine Health and Protocols NPC and the Western Cape Department of Agriculture (both Animal Health and Provincial Laboratory). The sentinel surveillance program is performed in partnership with the Western Cape Department of Agriculture and we thank Dr Gary Buhrmann (State Vet Boland) who is the primary liaison and supervisor of the program and to whom we report.

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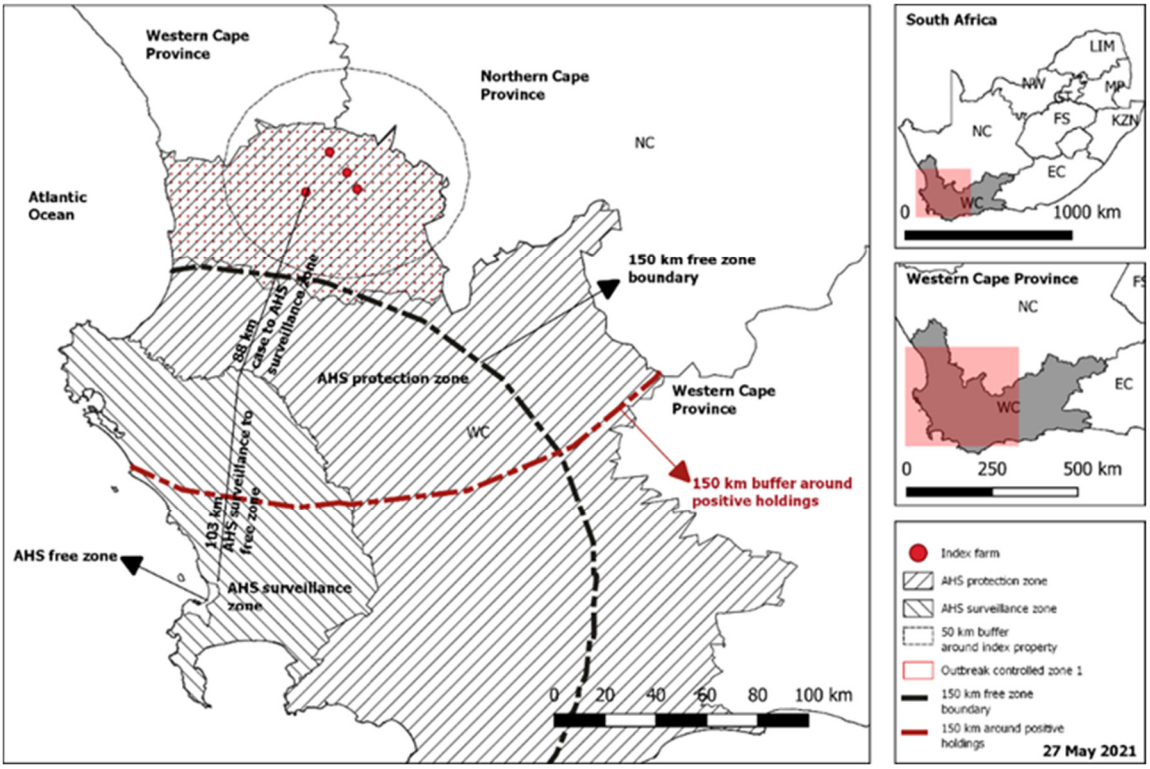

Figure 3: Map of the AHS cases associated with the 2021 protection zone outbreak in relation to the existing AHS controlled area and the provincial borders of South Africa. The outbreak control zone is shown in the main figure as well as the distances from the cases to the border of the AHS surveillance zone and from the AHS surveillance zone border to the AHS free zone in Cape Town. The red dot-dash line indicates a 150km buffer around all infected properties.

Outbreak events

A stray **dog** with wounds on his leg was found on Strand beach in **Cape Town** and was taken to a local veterinary clinic for treatment. He responded well to treatment initially, but three days later suddenly became aggressive and ataxic, biting the bars of his cage and trying to bite staff at the clinic. The dog was euthanased and tested positive for **rabies**. Additional rabies vaccination campaigns were done in Strand after the campaigns done in Gordons Bay in response to the earlier case of canine rabies in late September. A total of 2575 pets were vaccinated by animal health technicians during these campaigns.

Highly pathogenic avian influenza was reported in **wild birds** from several locations along the coast of the province, including Cape cormorants from **Dyer Island**; Cape gannets and Cape cormorants from Bird Island near **Lambert's Bay**; Cape cormorants, gulls and a northern giant petrel from **St Helena Bay**; a white breasted cormorant from Ottery in **Cape Town** and a white breasted cormorant from **Gansbaai**.

Increased mortalities and a decrease in egg production were detected on a layer **chicken** farm near **Paarl**. Post mortem signs were typical for **avian influenza**. The farm was immediately placed under quarantine and culling of the affected site began the next day. Subsequent PCR tests detected avian influenza matrix gene, but not H5, H6 or H7.

Chickens kept on a smallholding near **Yzerfontein** experienced a 40% mortality rate in the flock over a few weeks. The chickens showed difficulty breathing, swollen combs and a yellow, foamy diarrhoea. PCR testing detected **avian influenza** virus, but not H5 or H7. The property was placed under quarantine.

Disease investigations on three **ostrich** farms have resulted in the conclusion that they were infected with **H6 avian influenza**. Farms in the **Beaufort West** and **Albertinia/ Mossel Bay** areas tested seropositive in September and tested H6 PCR positive in October, on follow-up testing. A third farm, in the **de Rust** area, tested H6 PCR positive when tested as part of an H6 outbreak investigation on another ostrich farm in early October.

Two **rams** in the **Vanryhnsdorp** area showed swollen faces and ears, fever and sunburn after being moved to a new field. After investigation it was determined that they had consumed *Tribulus terrestris* (dubbeltjie), causing **photosensitivity**. The sheep were treated with antibiotics and anti-inflammatories.

Approximately 25% of chickens kept by a small farmer in Cape Town died after showing swelling of the heads, discharge from the eyes and difficulty breathing (Fig. 4). No abnormalities were seen on post mortem of a chick taken to the lab, other than mucoid discharge from the lungs and lung congestion. Differential diagnoses include fowl pox, infectious coryza and colibacillosis.

A horse near Malmesbury died suddenly with a swollen head and froth coming from the nose. On post mortem hydropericardium and petechial haemorrhages of the intestines were seen. African horse sickness virus was not detected in organ samples taken and no other horses on the farm were affected.

A farm cat near Riviersonderend was observed by the farmer to be acting strangely, isolating herself, lying out in the rain and shivering. When the farmer tried to move the cat, she bit him. The following day the cat began chasing staff on the farm and charging a fence to fight with the farm dogs. Suspecting rabies, the farmer shot the cat and took it to the local private vet for testing. The farmer also received rabies post-exposure prophylaxis for his bite wound. The dogs' vaccination history was checked and all dogs on the farm vaccinated. Rabies test results from the cat were subsequently negative.

Figure 4: Chicken showing severe swelling of the head (photo: Y. Sitandatu)

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EPIDEMIOLOGY REPORT

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African horse sickness vaccination 2021

Adapted from the African horse sickness control vaccination permissions: 2021 season report by J.D. Grewar[1] and C.T. Weyer[1]
[1] South African Equine Health and Protocols NPC

Introduction

Annual vaccination against African horse sickness (AHS) is compulsory in South Africa (Animal Diseases Act, 35 of 1984) except in the AHS free and surveillance zones in the AHS controlled area in the Western Cape province. Vaccination against AHS in these zones can only be performed following written approval from the Veterinary Services of the Western Cape Department of Agriculture (WCDOA). Permission to vaccinate against AHS is granted for vaccination to be performed only between 1 June and 31 October each year. This vaccination period is based on the potential for vaccine virus re-assortment/reversion to virulence and the risk of transmission during periods of increased vector activity. The restricted vaccination period mitigates this risk.

The process for vaccination permissions is summarized and available online at http://jdata.co.za/myhorse/documents/infographics/Vaccination%20Schema/1.%20Vaccinating%20against%20AHS%20in%20the%20Free%20and%20Surveillance%20Zone.pdf. This report briefly summarises the vaccination permission applications that were received and the descriptive statistics of those permissions that were issued. Permissions are given on an individual horse basis, with horses associated with specific holdings, and the information is analysed as such.

Summary of permissions issued

The total permission applications received are shown in Table 1 with their comparisons to previous seasons. Historically there are approximately 1100 applications received each year, totaling an associated 7300 horses. Since 2020, however, these applications and associated horses have been fewer, with less than 1000 applications totaling ~6700 individuals. In 2021 the majority (105 of 132 – 80%) of declined applications in 2021 related to invalid or non-existent passports, with a further 24 horses (18%) declined due to incomplete applications.

Thirty-seven veterinarians and veterinary practices were registered as the associated vet likely to perform the vaccination (compared to 39 the previous season), with the top five practices responsible for vaccinating 78.8% of the permission granted horses (n= 5326 of 6643), and the top ten practices responsible for 89.7% of all permission granted horses.

Table 2 shows the reasons that were provided by applicants (granted horses only) when requesting permission to vaccinate. The majority (89.4%) were to enable horses to comply with AHS movement requirements. This is also similar to previous years.

We now have five years of detailed, individual horse information for the vaccination permission process in the AHS controlled area. 4195 (4457 in 2019-2020) horses that were granted permission in 2021 had also been granted permission in 2020, making up 63.14% (68.8% in 2019-2020) of the total for the year. 1736 horses were granted permission to be vaccinated in 2017, 2018, 2019, 2020 and 2021, accounting for 26.13% of permission granted horses in 2020. There are currently 16498 horses registered in the AHS surveillance and free zone.

Conclusion

Vaccination coverage within the AHS controlled area, including the AHS surveillance and free zone, continues to be fairly comprehensive with approximately 40-50% of the known population being vaccinated based on permissions requested during any year. 14967 different horses have been vaccinated in the AHS surveillance and free zone in the last 5 years (i.e. since 2017). A high number of those horses are associated with repeat requests from year to year and also, since vaccination is

Table 1: Number of applications received for vaccination permissions with associated horses. Granted applications are shown with a percentage of the total in brackets.

Year	Applications received/ Associated holdings	Total horses applied for	Total horses granted
2017	1078/647	7183	6893 (96%)
2018	1117/606	7277	7058 (97%)
2019	1108/610	7330	7044 (96%)
2020	976/567	6691	6476 (97%)
2021	920/568	6775	6643 (98%)

a prerequisite for movement into the controlled area, any new adult horses entering the controlled area will be vaccinated already.

References and Acknowledgements

We are grateful to both horse owners and veterinarians for their patience during the vaccination permission season. We are grateful for the continued support of the Western Cape Veterinary Services who assist in this program and in particular Dr Gary Buhrmann from State Vet Boland. We acknowledge team members from the SAEHP: Danielle Pienaar; Esthea Russouw; Marie van der Westhuizen; Johanne Jacobs and Lizel Germishuys, who performed much of the data processing for the vaccination permission system.

Table 2: Reasons provided for the vaccination of horses

Overarching reason	Count
Movement requirements (current and for future events)	5924 (89.4%)
Individual protection (owner and yard) *	684 (10.3%)
Insurance	35 (0.01%)
Total	6643

*Individual protection is cited when owners/yard managers believe that the risk to their horse (based on movement risk or prior involvement in outbreaks) justifies vaccination.

Outbreak events

Outbreaks of **African swine fever** were detected in four new locations in the province, two within the City of **Cape Town** and two near **Vredenburg** on the West Coast. All outbreaks occurred in areas where a number of small farmers keep livestock together in close proximity and biosecurity is poor. Clinical signs reported by farmers generally included loss of appetite, reddening of the skin and death. Initial mortality rates reported by affected farmers ranged from 30-80%. The areas were visited and farmers educated about African swine fever and advised about biosecurity. Disposal of carcasses is often an issue and local municipalities were engaged to assist with doing so safely.

In late October, a wild **Cape cormorant** on **Jutten Island** near Langebaan was seen swimming in circles and showing signs of weakness, tameness and an abnormal head position. The bird was euthanased and tested positive for **H5 avian influenza**. A subsequent inspection of Jutten Island found 62 dead cormorants on 28 October and 352 on 4 November.

A Merino **sheep** farmer near **Paarl** noticed some of his flock showing chronic diarrhoea, weight loss and eventually death. A private veterinarian took samples, which tested positive for **Johne's disease**. The flock was placed under quarantine and the farmer plans to vaccinate in the future.

A case of **lumpy skin disease** was detected in an unvaccinated bull near **Stellenbosch**. There have also been informal reports of outbreaks of lumpy skin disease in the **Malmesbury** state veterinary area (Fig.1).

Figure 1: Typical lesions of lumpy skin disease (photo: M. Vrey)

Three **goats** kept near **Robertson** showed a loss of appetite, lameness of the hind legs, neurological signs and death. A post mortem examination revealed meningitis, and bacterial culture of brain samples resulted in **listeriosis** being identified as the cause of death.

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EPIDEMIOLOGY REPORT

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2021 in review

2021 saw the outbreaks of several controlled diseases of importance, including rabies in dogs, African swine fever, African horse sickness and highly pathogenic avian influenza. It was a busy year for our officials working to contain these outbreaks as well as prevent further outbreaks through movement controls, culling, vaccination campaigns and education of animal producers about biosecurity.

Surveillance/ field activities

Our field officials made 13 222 visits to properties where animals are kept in 2021 in order to do disease surveillance, animal census, farmer education, primary animal health care and disease control activities.

Rabies (Fig. 1)

Sporadic cases of wildlife rabies were seen in various parts of the province and throughout the year, similar to previous years. However, in addition, dog rabies cases were detected in Cape Town for the first time since 1994. Four cases in total were reported between August and October 2021. Three of the dogs were kept as pets in fenced yards: two in Khayelitsha and one in Gordon's Bay. The fourth and last was an apparently stray dog found on Strand beach. Typing and preliminary phylogenetic analysis of the rabies virus from the pet dog in Gordon's Bay indicated that it was a canid strain most closely related to rabies viruses from the Eastern Cape. Given the currently high incidence of dog rabies in the Eastern Cape and KwaZulu-Natal, the repeated introduction of rabid dogs with the movement of people from these areas is probable.

The state responded to these cases with swift and comprehensive emergency vaccination campaigns in

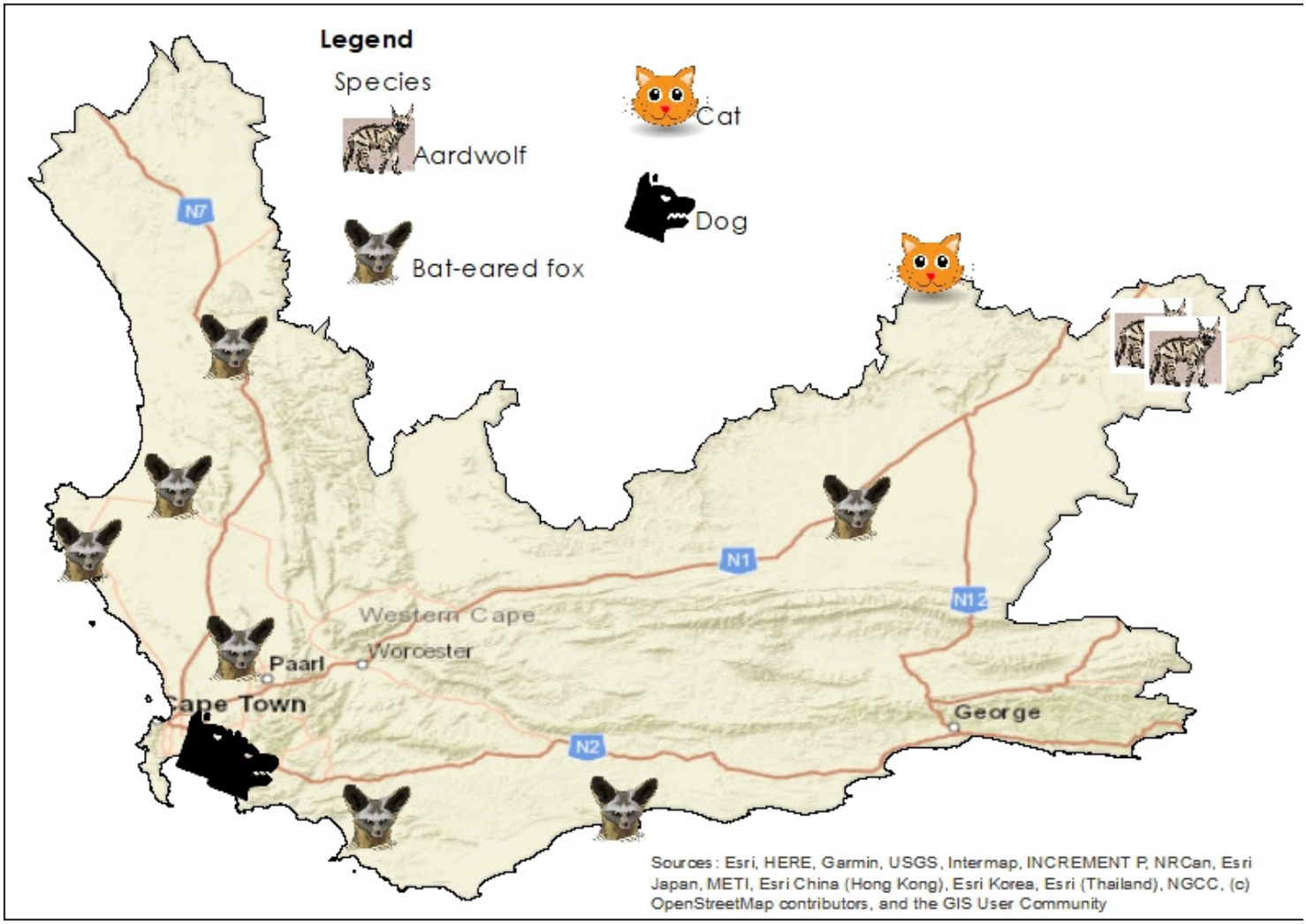

Figure 1: Rabies cases reported in the Western Cape in 2021

the areas surrounding the outbreaks. Routine state-sponsored rabies vaccination campaigns usually take place where there is a lack of access to veterinary care, including rural areas and indigent communities. In 2021, 122 200 animals were vaccinated by state officials as part of these efforts. Rabies vaccination coverage is therefore good in certain areas of Cape Town but unknown in others, as owners of pets who have access to private veterinary care are expected to maintain their animals' rabies vaccination status. Despite rabies vaccination of dogs and cats being a legal requirement under the Animal Diseases Act, many dog and cat owners are not aware of the necessity of doing so. The state is assisted by private veterinarians, animal welfare organisations and community leaders in educating the public about their responsibility to vaccinate to protect both animal and human health.

There were no new cases of rabies detected in the Western Cape after October 2021.

Tuberculosis:

A wild male baboon was found on a wine farm near Franschhoek: underweight, breathing heavily, weak and lethargic. The baboon was euthanased and a necropsy found numerous abscess-like lesions, some with necrotic centres, in the lungs, kidneys, spleen, liver and lymph nodes. Histopathology of the lesions revealed granulomatous inflammation with high numbers of acid-fast, rod-shaped bacteria. Mycobacterial culture of samples taken from the lesions was inconclusive, but it is believed that this was most likely a case of *Mycobacterium tuberculosis*, given the high prevalence of human tuberculosis and the low prevalence of bovine tuberculosis in the Western Cape. Additionally, very few cattle are kept in the Franschhoek area, and the baboon would have had far more opportunities to interact with people than with bovines.

No cases of tuberculosis were reported in any other animal species in the province in 2021.

Pig diseases (Fig. 2):

African swine fever (ASF) was detected in the Western Cape for the first time in February 2021. As the year continued, ASF outbreaks were confirmed at 24 locations in the province. All of these outbreaks occurred in similar circumstances: among small-scale farmers with few biosecurity measures in place. The majority were in areas where many farmers keep livestock belonging to different owners in close proximity to each other. Three of the outbreaks have been

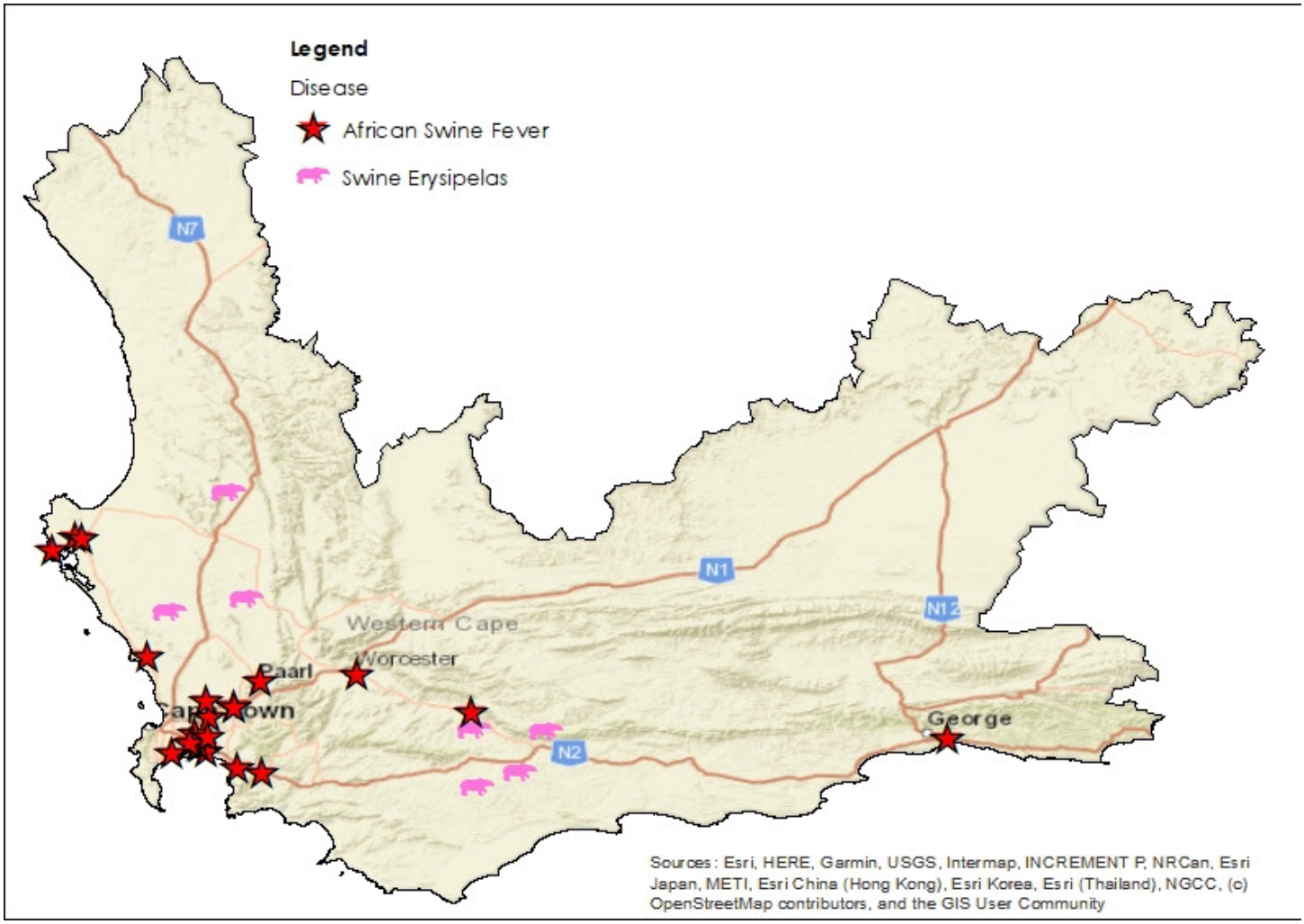

Figure 2: Controlled and notifiable diseases of pigs that were reported in the Western Cape in 2021

resolved by the end of 2021. Unfortunately, control of outbreaks in these circumstances is challenging, as many of the affected farmers do not report outbreaks and do not observe recommended biosecurity or quarantine measures. Movement of pigs to new areas occurs frequently, causing new outbreaks if the pigs are infected.

Sporadic cases of swine erysipelas were reported from some commercial piggeries in the province during the year. These occur at a low frequency and are usually detected at the abattoir after slaughter, when characteristic skin lesions are seen on pig carcasses after passing through the scalding tank.

Equine diseases (Fig. 3):

In April and May, an outbreak of African horse sickness (AHS) occurred in the Clanwilliam area inside the AHS protection zone. An outbreak control zone with movement control was therefore put in place and increased surveillance done in the area. The outbreak affected four properties with a total of 37 cases of AHS confirmed, including 20 mortalities. All cases occurred in horses, with the exception of one donkey. The outbreak was declared resolved and the special movement controls lifted in July 2021.

Five confirmed or suspect outbreaks of AHS were also reported from the infected zone of the province in May, including one property near Vredendal and four in the Beaufort West area.

Small stock (Fig. 4)

Twelve outbreaks of sheep scab were reported and treated under official supervision during 2021. Unfortunately, in many of these cases the state was only consulted after months of the affected farmers trying to treat the problem themselves, without success. Sheep owners are reminded that, by law, any condition causing pruritus in sheep is notifiable to the local state veterinarian. 80% of the sheep scab outbreaks were reported in the cooler months between May and August, as this is the time when mites become more active and itching and wool loss in the flock becomes more obvious.

Johne's disease was confirmed on seven sheep farms, mainly in the Swartland area. These farms were placed under quarantine and the affected farmers advised to consider a vaccination programme to reduce clinical disease in the future.

Bluetongue outbreaks were reported from 18 sheep

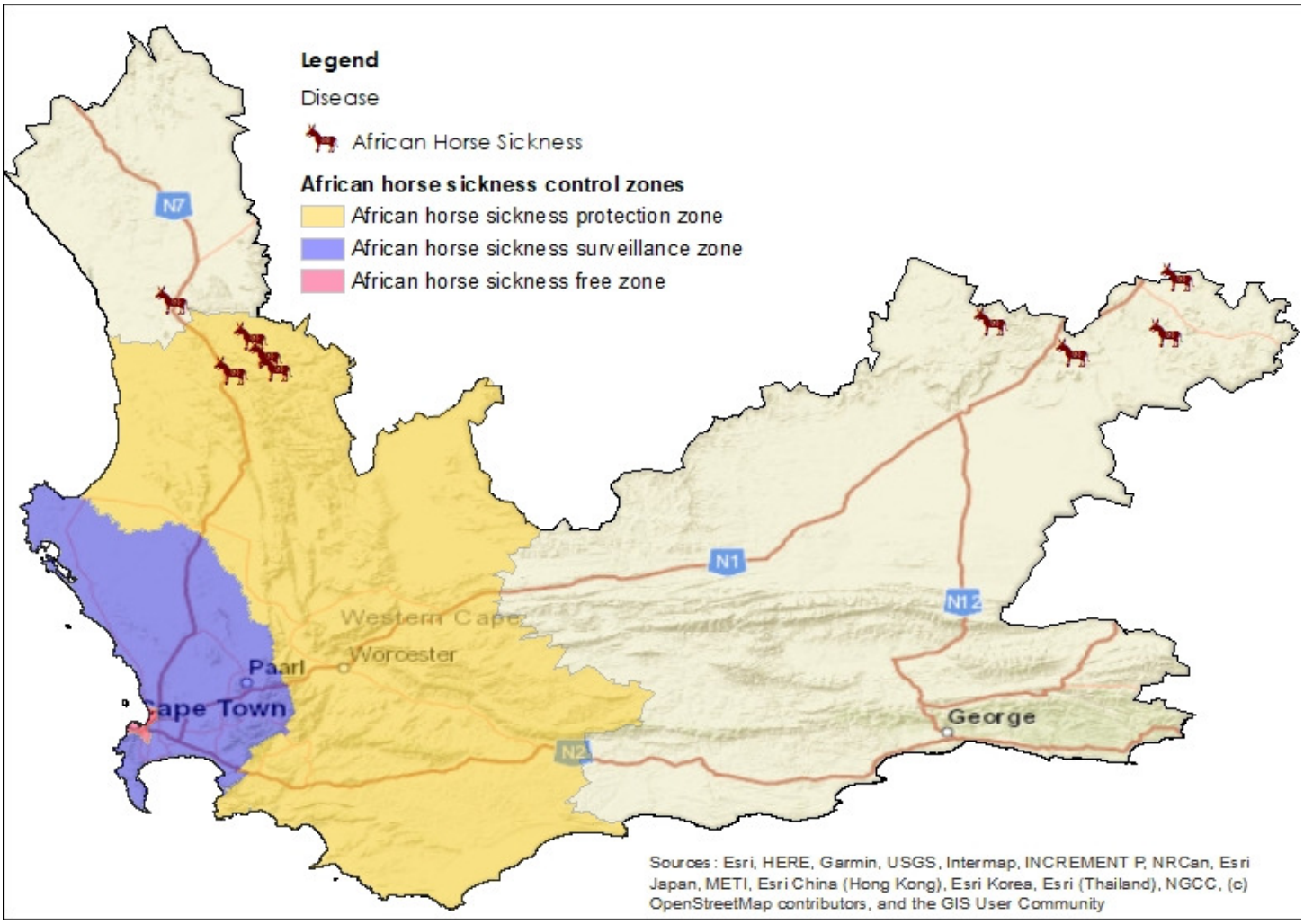

Figure 3: African horse sickness cases reported in the Western Cape in 2021

flocks in the Western Cape. The majority occurred between February and May in the Karoo areas of the province.

No controlled or notifiable diseases were reported in goats in 2021.

Cattle (Fig. 4)

One herd of cattle belonging to a speculator near Stellenbosch tested positive for *Brucella abortus*. The property was placed under quarantine and a test-and-slaughter policy has been adopted to control the disease.

Outbreaks of lumpy skin disease were reported from 17 farms in various parts of the province. Half of these were reported in April. No cases of lumpy skin disease were reported in March, June, or between August and October.

Avian diseases (Fig. 5)

Since 4 May 2021, 25 outbreaks of H5N1 highly pathogenic avian influenza (HPAI) in poultry were reported to the OIE from the Western Cape: 13 in commercial chickens, eight in ostriches and four in backyard poultry. Additionally, one case in hobby birds was reported. Of the commercial chicken units, three produced broilers, three had broiler breeders, six had layers and two were rearing farms for broiler breeders or layers. Ten of the outbreaks in commercial chickens occurred in May and over a million birds died or were culled to control the outbreak.

Another 33 sites and areas were reported as having HPAI -infected wild birds, including 23 different indigenous species. Eight species were inland birds, eleven were coastal and four pelagic. Dead and sick coastal birds were reported widely along the Western Cape coast, but the worst affected areas seem to have been Dyer Island, where over 15 000 Cape cormorants and over 200 African penguins died, and Velddrift, where over 4000 Cape cormorants were affected. Though HPAI was detected in coastal birds (mostly gulls) from May, mass mortalities (mostly Cape cormorants) only began in mid-October and continued into November. 25 000 dead or sick birds, suspected to have been infected, had been counted by the end of December.

One ostrich farm was diagnosed with H7 low pathogenicity avian influenza (LPAI), using serology, in February.

LPAI H5N2 was detected on an ostrich farm in March

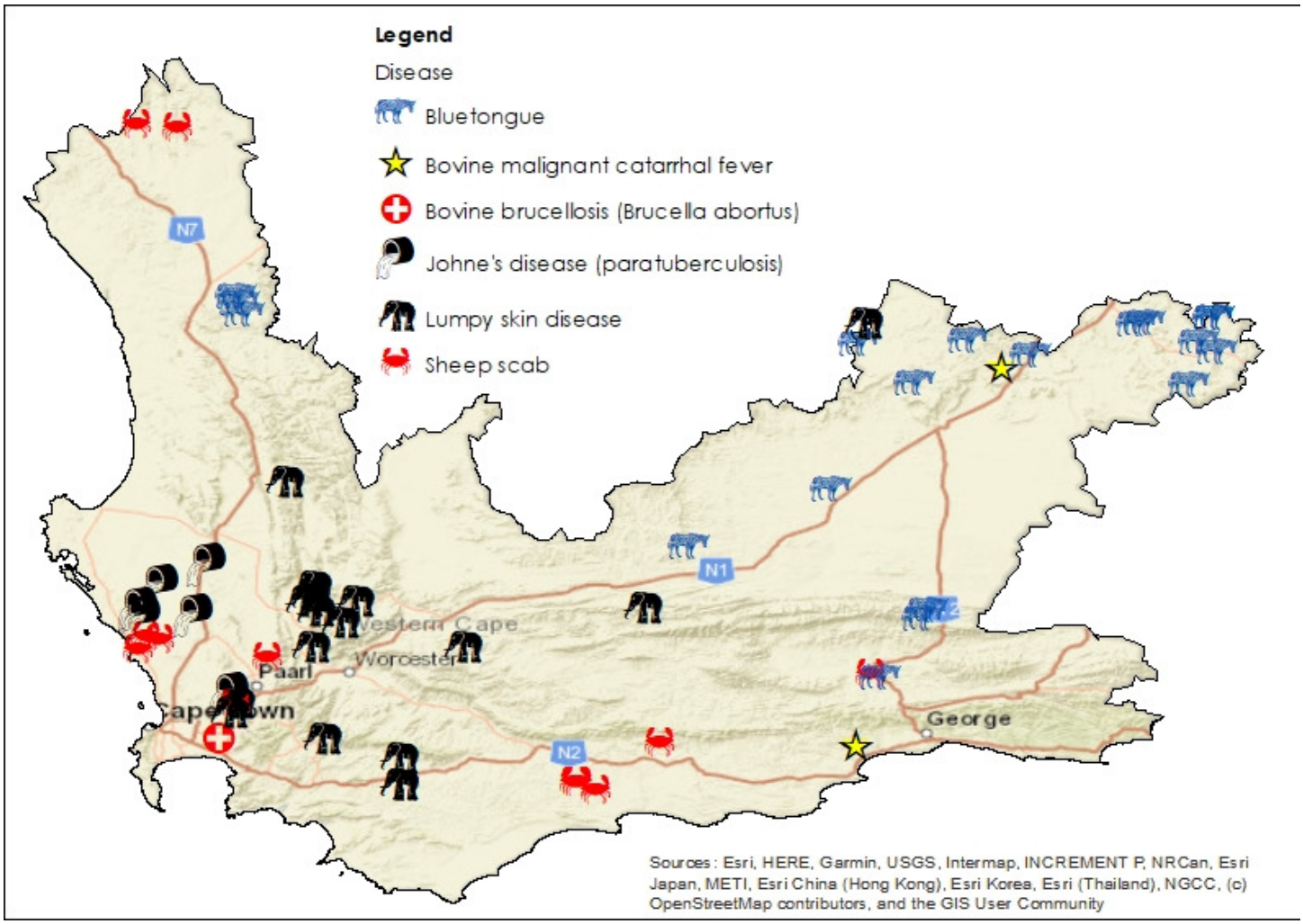

Figure 4: Controlled and notifiable diseases of domestic ruminants reported in the Western Cape during 2021

and diagnosed on a second farm close by in July, based on serology.

An ostrich farm was found to be seropositive for H6 avian influenza in February, and another four farms were diagnosed in September and October, three based on virus detection.

Four ostrich farms, one backyard poultry holding in Khayelitsha, with turkeys and chickens, and a backyard chicken holding in Yzerfontein were concluded to have had undefined, non-H5, H6 or H7 avian influenza infections.

Three African grey parrots died of psittacosis (*Chlamydia psittaci*) in September at a parrot-breeding facility near Piketberg. The property was placed under quarantine and the birds were treated for 45 days with doxycycline.

Three commercial chicken farms tested positive for *Salmonella enteritidis*. One of these was in environmental swabs in a breeder unit and the chickens were slaughtered out. The other two were in broilers: one detected in environmental swabs in 18-day-old chickens, the other detected in neck skins after slaughter. The meat from the affected broilers was detained.

In March, *Salmonella gallinarum* (fowl typhoid) was diagnosed on a layer farm and the affected house was depopulated and disinfected. In July *Salmonella gallinarum* was detected on a layer pullet rearing farm. The birds were treated and vaccinated, but the infection recurred in December after the birds were moved and started laying.

Tests for Newcastle disease were positive for doves and pigeons from eight locations across the province. All but one, where results are pending, proved to be due to pigeon paramyxovirus (PPMV). Two outbreaks involved domestic pigeons and one occurred in feral pigeons. Indigenous wild birds affected included laughing doves (*Spilopelia senegalensis*) in four outbreaks and rock pigeons (*Columba guinea*) in two.

Acknowledgements

We would like to thank all of the animal health technicians and state vets who collect and report data from the field, as well as the members of the public and animal keepers who participate in reporting suspect outbreaks of animal diseases. Without your efforts this report would not be possible.

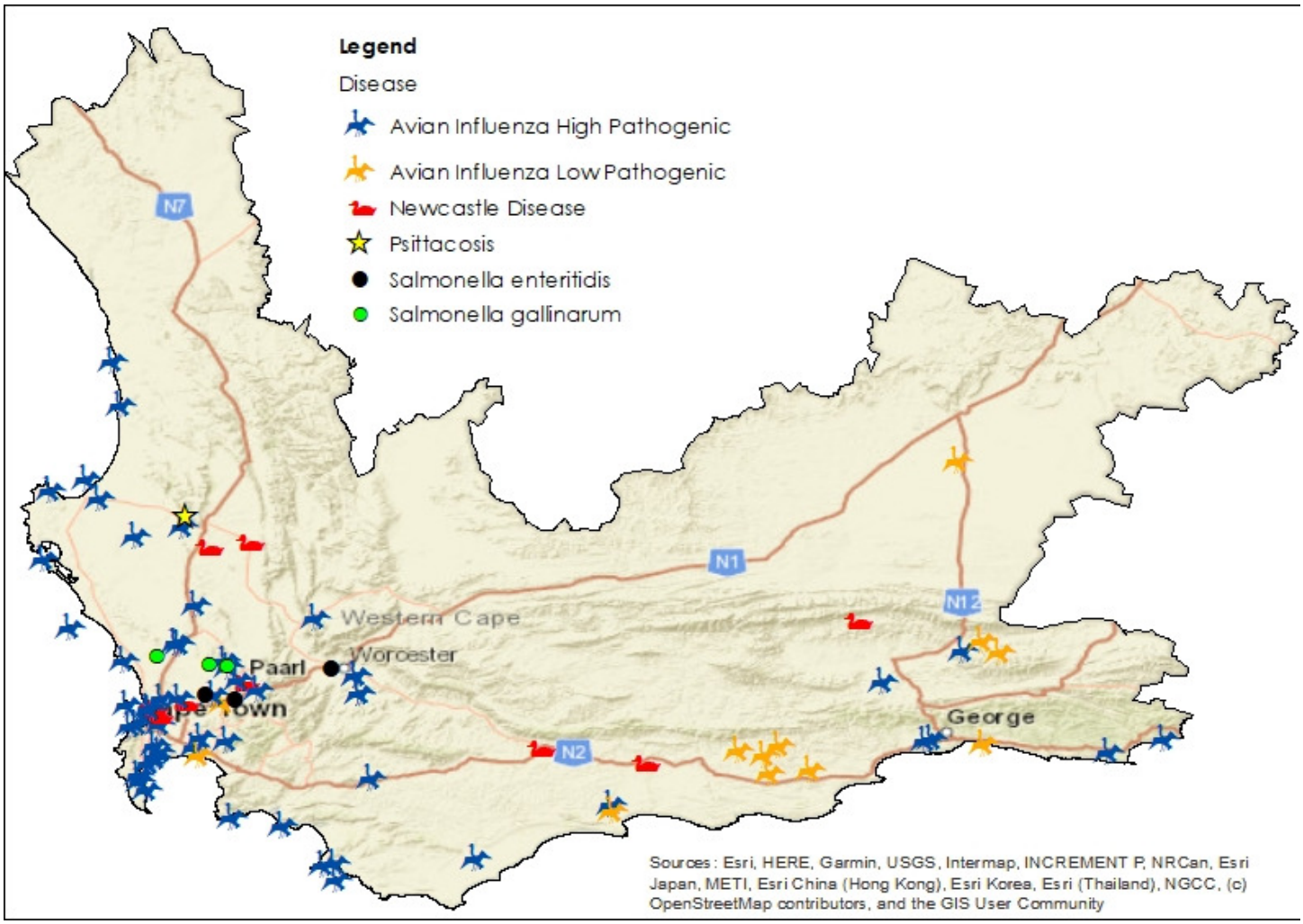

Figure 5: Controlled and notifiable diseases of birds that were reported in the Western Cape in 2021

Farewell to Lugen

At the end of December 2021, we said goodbye to Lugen Govender, who has been our Data Processor in the Epi Section for almost 15 years. Lugen captured and managed data for Animal Health in a diligent and accurate manner. He enabled the functioning of our ostrich data management system as well as the documentation of our chicken and pig surveillance program in the province.

Lugen was dedicated to lifelong learning and the development of skills in the Epi Section. In his time with us he became proficient in the use of geographic information systems to help with mapping of data. More recently, he completed his certification as a remote pilot in order to operate drones for collection of data for Veterinary Services.

All in all, Lugen's work ensuring the accurate capturing of data kept the Epi Section running smoothly. We wish Lugen all the best in his new position and for his career in the future.

Outbreak events

African swine fever outbreaks were confirmed on small-scale pig farms in the Kuilsriver and Eerste River areas of **Cape Town**. At the former, 87% of the pigs died after showing lameness, a lack of appetite and weakness. At the latter, mortality rate among the pigs was 100%.

Highly pathogenic avian influenza was diagnosed in **Cape cormorants** and **white-breasted cormorants** from **Nature's Valley**, a **common tern** with neurological signs from **Rocherpan Nature Reserve** (near Velddrif) and a weak common tern from **Elands Bay**. Dead Cape cormorants were also found at the latter two locations.

A **Cape cormorant** was found near **Wilderness** appearing tame, weak and sneezing. It tested PCR positive for **avian influenza** matrix gene, but not H5 or H7. Soon after testing, the bird recovered and escaped from its rehabilitator.

An **ostrich** farm near **Oudtshoorn** tested seropositive for **avian influenza**, with antibody titres suggesting an infection with H5N1.

Johne's disease was confirmed in two **sheep** flocks in the **Malmesbury** and **Moorreesburg** areas.

Salmonella gallinarum caused increased mortalities of layer **chickens** once they reached peak production on a farm in the **Paardeberg** area. It is suspected that the outbreak spread from another previously infected farm in the province despite vaccination and treatment of the flock.

Outbreaks of **lumpy skin disease** were reported in **cattle** from the **Caledon** and **Citrusdal** areas.

Erysipelas of swine was detected after slaughter in pigs from farms near **Gouda** and **Klapmuts**.

A **ewe** in **Vanrhynsdorp** was treated for clinical **mastitis**.

Goats were treated for **footrot** near **Caledon**.

A **ram** died suddenly near **Vanrhynsdorp**. After an investigation the cause is suspected to be **prussic acid poisoning**.

A **calf** near **Vanrhynsdorp** was treated for constipation and dehydration thought to be caused by an **impacted abomasum**.

200 **ostrich** chicks near **Riversdale** died of starvation following foreign body **impaction of their crops**.

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