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African horse sickness control

Surveillance report

Sentinel Surveillance 2024

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Western Cape Government
FOR YOU

Overview

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. Historically the program had two components – a sero-sentinel program that evaluated 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. In 2023 the serological component of the program was suspended with the PCR-based program remaining the focus of the program.

The PCR sampling target is drawn up to detect AHS at approximately a 2% minimum expected prevalence (with a 95% confidence level), resulting in a monthly sampling target of 150 animals. The vaccination status of PCR sentinels does not influence their recruitment, unless vaccination against AHS took place sufficiently recently to result in positive PCR results on initial testing.

A detailed description of the original program is available in the January 2016 Western Cape Epidemiology Report. The summary report for the 2021/22 season can be found in the July 2023 Epidemiology Report. All other reports can be found at www.myhorse.org.za.

Viral RNA PCR testing is generally performed at the Stellenbosch Provincial Veterinary Laboratory (SPVL) in the sentinel surveillance program. During 2024 however, samples were tested at the University of Pretoria/Equine Research Center's Molecular Diagnostics Laboratory as the SPVL was undergoing renovations and was not in a position after re-opening to process the samples required for the sentinel program. The PCR test method used is a University of Pretoria (Equine Research Center) developed, and WOAH validated, real-time RT-PCR (Guthrie et al. 2013).

This report covers the AHS sentinel program for the 2024 calendar year. The results confirm that it is unlikely that AHS was circulating in the AHS free and surveillance zone during this period.

General overview of sampling and results

1588 PCR sentinel samples were analysed from 59 different farms at an average of 132 samples from, on average, 40 different farms per month. All samples tested negative.

Investigations

There were no follow-up investigations because of suspect or positive laboratory results during the year. There was however an investigation into a sentinel that presented with fever and lethargy in May 2024. Samples were taken and submitted with negative AHS and EEV results - E240747. The same sentinel was again tested in early June 2024, again with negative results for both AHSV and EEV.

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 1 and Figure 2 show the underlying population and current sentinel farms and the monthly average distribution of sentinels in the PCR sentinel program. The Paarl, Stellenbosch and Mitchells Plain areas still require representation in the program.

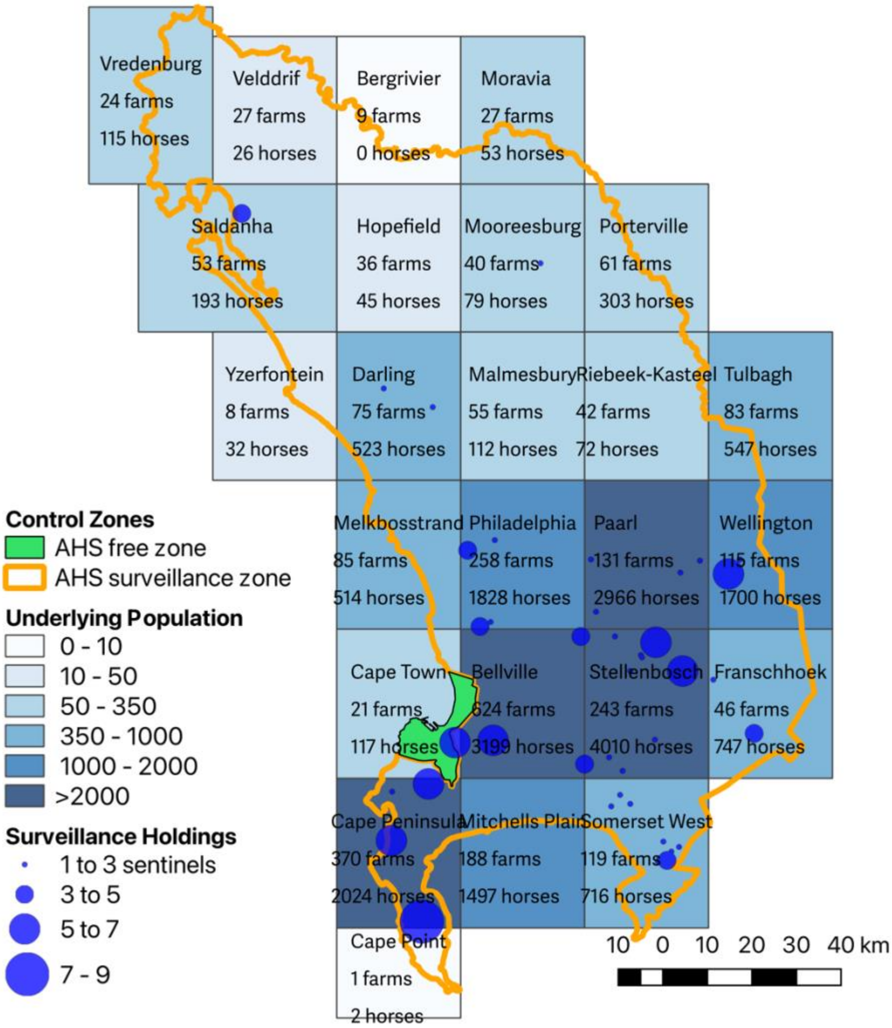

Figure 1: The underlying population of horses in the Surveillance and Free Zones of South Africa. These populations have been revised based on new population data collected between 1 April 2016 and December 2024.

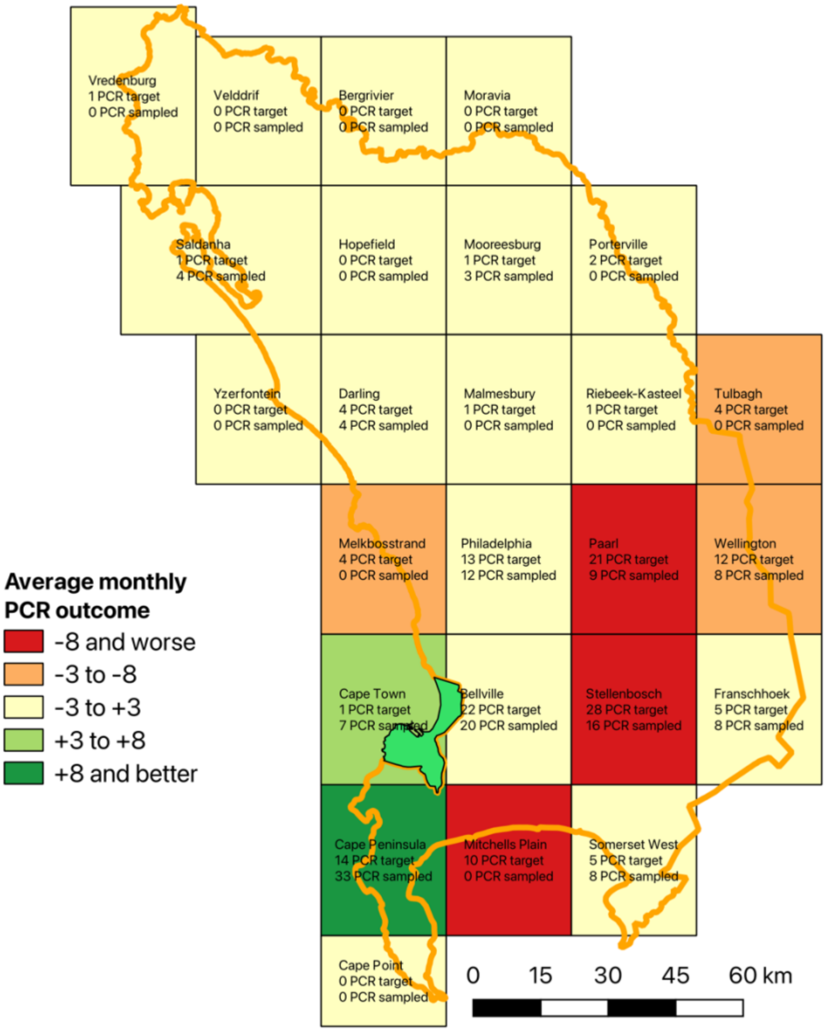

Figure 2: A map showing the AHS surveillance and free zone where PCR-sentinel surveillance has taken place during 2024. The map depicts the various areas with their target PCR samples to detect a 2% minimum expected prevalence using a proportional sampling frame. The red and orange areas are areas where PCR-sentinels were lacking on average while the light green to green areas show where surplus PCR-sentinels were sampled. Cream areas depict where the target was generally attained.

Surveillance system evaluation

The surveillance program is designed to detect AHS in the AHS surveillance zone at a minimum expected prevalence of 2% (MEP). In this section of the report, we establish the monthly sensitivity of the surveillance program. Note that previous analyses evaluated the program at a 5% MEP based on EU 2008/698 requirements – this legislation is now repealed and, since the program aims at a 2% MEP, the evaluation thereof has been adjusted to this level.

Parameters used in this evaluation are shown in Table 1 and analysis is based on evaluating sensitivity of surveillance programs (Martin et al. 2007). The historical surveillance outcome is considered as it provides information that aids in determining an accurate final probability of freedom as of December 2024. The final probability of freedom from Sept 2016 through December 2024 (100 months) was 87.9%, down a percentage point from Dec 2023 - see Figure 3).

The sensitivity of the sentinel surveillance dropped to between 20%-25% in 2024 and the resulting probability of freedom dropping slightly is a consequence of this. This is the eighth 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 in 2021.

Parameter	Value	Comments
$pIntro$	0.03	During periods where not outbreaks in the AHS controlled area are present. Based on historical outbreaks in the region.
	0.3	During periods where outbreaks are present in the AHS controlled area – estimate made increasing probability of introduction 10X the normal rate
Population at risk – total herds	1556	Data captured between 1 April 2016 and Dec 2024 for the AHS surveillance and free zones.
Sentinel farm populations	Various	Based on herd size as of Dec 2024 . The assumption is made that herd size would not change substantially on the sentinel properties over the period reviewed.
Sentinels tested per herd per surveillance period	Various	Actual tested data
Unit design prevalence (P_A^*)	0.02	Design prevalence at animal level
Herd design prevalence (P_H^*)	0.02	Design prevalence at herd level based on prior outbreaks (median value taken) in the controlled area assuming a herd PAR of the zones affected by each outbreak.
Test sensitivity	0.978	As published (Guthrie et al. 2013). Note that while serology was taken into consideration, for this analysis all horses that were tested on serology were tested on PCR – hence the use of a single test sensitivity across the analysis
Initial Prior confidence of Freedom	0.5	September 2016

Table 1: Parameters used to establish sentinel system probability and sensitivity of freedom for African horse sickness

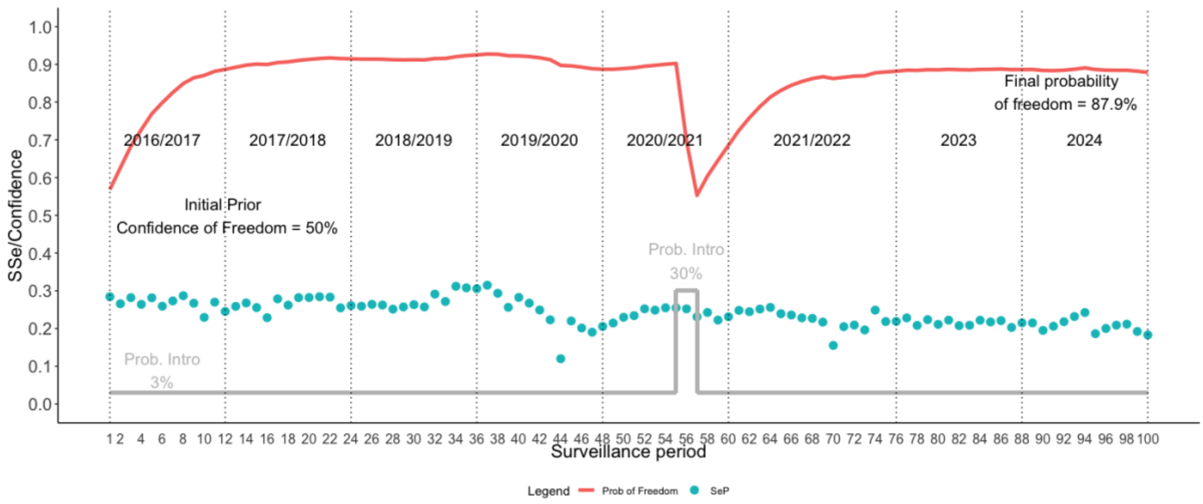

Figure 3: The sentinel surveillance sensitivity of individual surveillance periods (SeP - dots) with probability of freedom curve (red line) for the past seven surveillance seasons: the season currently reviewed is the 2024 calendar year. Probability of AHS introduction of 3% is set for periods where 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.

Discussion and Conclusion

The primary goal of demonstrating AHS freedom 2024 was achieved. A 8-year review of sentinel results show that the probability of freedom attained for this program, at an animal design prevalence of 2% and herd-level design prevalence of 2%, shows an 87.9% 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 in 2021. It further does not take into consideration the passive surveillance component. Spatial representativeness remains challenging and a recruitment drive in the Paarl, Stellenbosch and Mitchells Plains areas is recommended.

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 University of Pretoria Molecular Genetics Laboratory who performed the testing of samples this season.

In this season the sentinel program was again achieved through collaboration between the Western Cape Department of Agriculture (Veterinary Services) and SAEHP. In this regard we specifically acknowledge Dr Tasneem Anthony. The WCDOA also currently fund the testing costs associated with the program. We are grateful to the SAEHP team who are directly involved with the program: Esthea Russouw and Lizel Germishuys.

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