Western Cape Government

EPIDEMIOLOGY REPORT

Agriculture
VETERINARY SERVICES
May 2023
Volume 15 Issue 5

Dourine surveillance 2022

Adapted from the 2022 Dourine Surveillance Report by John Grewar (SAEHP), Camilla Weyer (SAEHP) and Lesley van Helden (WCDOA)

Since 2018 active dourine surveillance has taken place in the Western Cape Province in the form of the testing of either sentinel horses pulled from the African horse sickness (AHS) sentinel program or formal surveys of randomly selected horses in the AHS free zone (2020). The intent has been to perform surveillance in sentinel animals at 6-monthly intervals. The program in 2018 and 2019 was only performed in the first halves of these years. In 2020 the targeted AHS free zone survey was performed in the first half of the year as well. In 2021 the biannual target was achieved with sentinels tested from the June and December cohorts. This has again been achieved in the same manner in 2022, the period evaluated in this report. An introduction to dourine, and the reason surveillance is required, has been thoroughly described in previous reports – available at https://www.myhorse.org.za.

Scope

To provide evidence for freedom of dourine within the same area where active surveillance is undertaken against AHS, i.e. the AHS surveillance and free zone in the Western Cape Province.

Surveillance parameters

Table 1: Surveillance parameters used in design and evaluation of the surveillance event

Parameter	Value
Population at risk	16000
Design Prevalence	~5%
Test Sensitivity	90%
Test Specificity	Unknown but system specificity of 100% assumed
Type 1 error	5%

A goal of 60 serological sentinels per month is the requirement for AHS sentinel surveillance testing for direct exports from South Africa to the EU. Over and above this, South Africa samples another 90 horses in the AHS surveillance zone to test approximately 150 horses in the zone using PCR testing. Given that serum samples are taken from all 150 sentinels, the sampled horses for the dourine surveillance were targeted from the horses sampled that were not tested serologically for AHS. Samples were taken in June and December for the two surveillance periods respectively.

Results

A total of 100 horses were sampled at 34 locations across the AHS surveillance zone in June 2021. In December, 100 horses were sampled in 38 locations. Proportional numbers of horses sampled across the

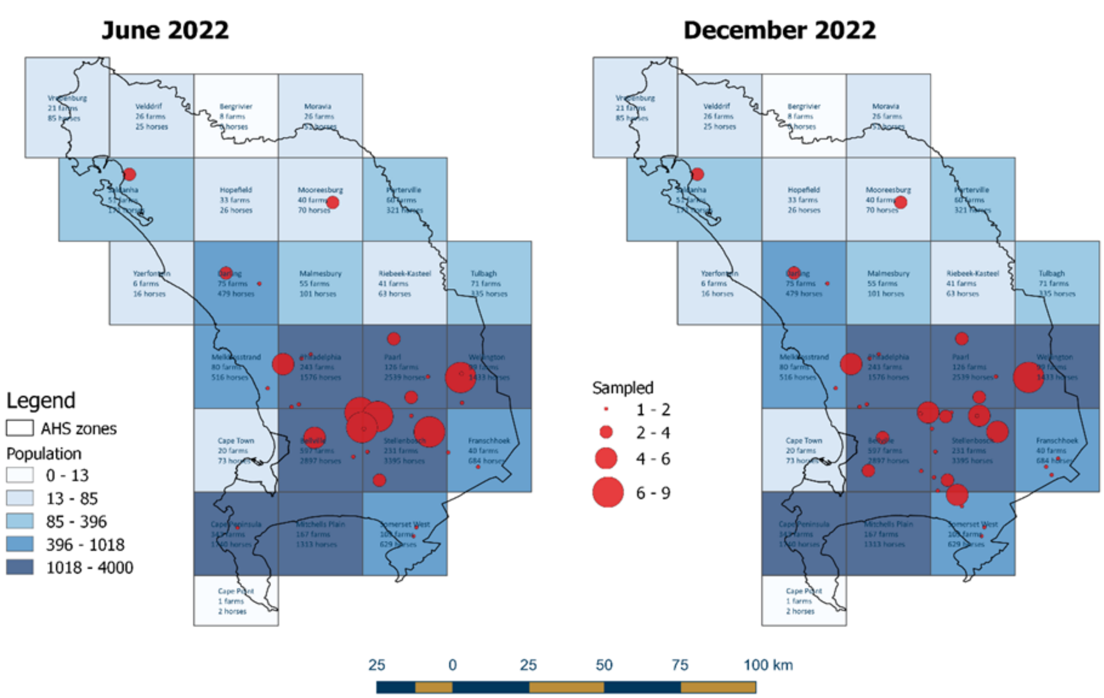

Figure 1: Dourine survey locations showing proportional circles for number of horses tested per location in June and December 2022. The underlying population at risk is shown with a light to dark blue gradient. This is to show that locations were chosen to reflect the relative underlying population at risk per surveillance grid.

surveillance zone are shown in Figure 1. The AHS sentinel surveillance program makes every effort to sample horses in proportion to their relative underlying population at risk using a gridded surveillance system, as depicted in Figure 1. Most samples were thus taken from an area of approximately 50-75 km around the Kenilworth Quarantine Station, from which horses are exported. In June and December 2023, the 100 samples taken per surveillance month tested negative for dourine antibody using the CFT. The sensitivity (and resulting probability of freedom) of the surveillance program is shown in Table 2 below. This evaluation is independent of any prior surveillance. While the sentinel surveillance program is based on a single stage sampling strategy (evaluated in column 2 of Table 2), we have estimates of the underlying number of herds in the surveillance zone as well as estimates of the herd sizes of the sampled herds. This allows an estimate of surveillance sensitivity in a more realistic setting (column 3 of Table 2). Note that in this latter analysis we reverted to an effective population design prevalence of 2% (within herd design prevalence of 20% and herd level prevalence of 10% throughout the population) – this in an effort to depict a reasonable minimum expected prevalence with so few cases of dourine reported in the prior two decades in the AHS surveillance zone.

Table 2: Design prevalence with resulting surveillance sensitivity and probability of freedom outcomes for two different scenarios independently analysed: the sentinel program design prevalence and the generic values used given the history of cases in the AHS controlled area. NOTE: This evaluation is for a single point in time and does not consider previous surveillance.

Parameter	**Descriptions and values based on varying data sources**			
	Single stage population sensitivity		Generic prevalence to result in effective design prevalence of 2% with 2-stage analysis	
Animal level prevalence (P^*_U)	0.05		0.2	
Herd level prevalence (P^*_c)	n/a		0.1	
Effective population prevalence ($P^*_U \times P^*_c$)	0.05		0.02	
	Jun 2022	Dec 2022	Jun 2022	Dec 2022
***MeanSSH* - Mean herd level surveillance sensitivity**	n/a		0.435	0.474
***SeP* - Population surveillance sensitivity**	0.989	0.989	0.77	0.838
***PFreeU* - Confidence of population freedom – uninformed prior**	0.987	0.987	0.78	0.834

With surveillance evaluation it is also appropriate to evaluate probability of freedom outcomes given prior surveillance events. In Figure 2 below, this evaluation shows all seven surveillance events undertaken to date in the AHS surveillance and free zones (see previous reports). Where surveillance was missed (second half of 2018 (H2), 2019 (H4) and 2020 (H6)) a zero sensitivity is assumed. Note also that the surveillance in 2020 (H5) was targeting the AHS free zone only, but the evaluation below assumes a population at risk across the AHS free and surveillance zone for standardization purposes. The dourine probability of freedom in the AHS free and surveillance zones in June and December 2022, given the 2022 surveillance efforts alone, ranges between 78% and 98.7% depending on the analysis used. The overall probability of freedom taking prior surveillance into account is 97.7%.

Discussion

Stand-alone surveillance efforts like the one described here supplement the current clinical passive surveillance and Thoroughbred pre-breeding dourine surveillance efforts in South Africa. While the scope is limited to the AHS free and surveillance zone, we believe this will assist in export protocols that require dourine freedom statements where horses are exported from AHS free zone quarantine facilities such as Kenilworth Quarantine Station.

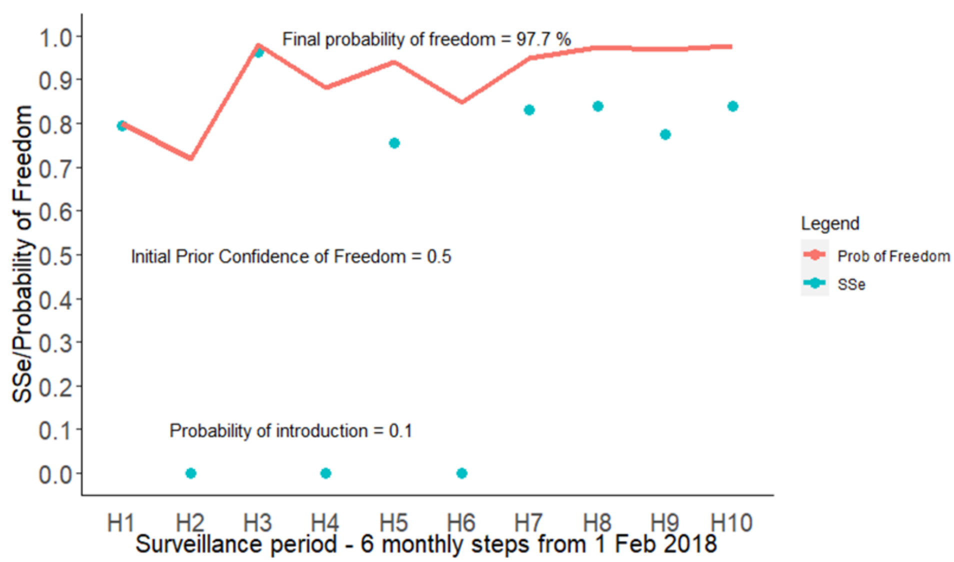

Figure 2: Surveillance system sensitivity and probability of freedom assuming an introduction probability of 10%, an underlying herd and animal prevalence of 20% and 10% respectively and an uninformed prior probability of 50% in period 1

Outbreak events

A commercial layer **chicken** farm near **George** experienced a sudden increase in mortalities and **H5N1 high pathogenicity avian influenza** was confirmed as the cause shortly thereafter. Chickens in the affected houses were culled and buried along with their eggs on the farm.

Mortalities of **wild birds** as a result of **high pathogenicity avian influenza** was reported from several locations along the **west coast** of the province between Cape Town and Lambert's Bay. Affected species included swift terns (*Thalasseus bergii*), a common tern (*Sterna hirundo*) and a kelp gull (*Larus dominicanus*).

After sudden deaths of 40/120 young racing **pigeons** occurred in a loft in **Cape Town**, test results were positive for **pigeon paramyxovirus** and **H5 avian influenza**.

A **marabou stork** (*Leptoptilos crumenifer*) died at a bird sanctuary in **Cape Town** and tested positive for **avian influenza**, but negative for H5 and H7.

A **bat-eared fox** was seen on a farm near **Witsand** showing neurological signs and abnormal behaviour. The farmer shot the fox and submitted it for testing before it had contact with any other animals or people. The fox tested positive for **rabies**. Dogs and cats in the area were vaccinated against rabies in response.

Deaths were seen amongst a colony of feral **rabbits** living in Brenton-on-Lake near **Knysna**. Carcasses that were submitted tested positive for **rabbit haemorrhagic disease**. Biosecurity measures and preventive vaccination were discussed with the local private veterinarian and community representative.

A case of **bovine malignant catarrhal fever** (BMCF) was diagnosed clinically on a farm near **Stellenbosch** that had previously experienced cases of wildebeest-associated BMCF. Black wildebeest are kept on a neighbouring property. Later in May, classic clinical signs of BMCF, including corneal opacity, blindness and nasal discharge (Fig. 3) were seen in a cow on another farm in the area, approximately 3km away from the first case.

Cases of **bluetongue** occurred in **sheep** near **Worcester** and **Oudtshoorn**.

Lesions of **swine erysipelas** were seen after slaughter on pig carcasses originating from the **Ashton** and **Malmesbury** areas.

A diagnosis of **ovine Johne's disease** was confirmed on a farm near **Darling** after the farmer had noticed a few ewes losing weight each year during lambing season.

Oedema disease (caused by *E. coli*) caused deaths of **piglets** near **Atlantis**.

During an inspection at an auction near **Gouda**, **red lice** were seen on **sheep**.

***Salmonella* Enteritidis** was cultured from samples taken during routine surveillance on 12 broiler **chicken** properties in the **Paarl**, **Malmesbury** and **Worcester** areas. The majority of these were linked to a single parent flock.

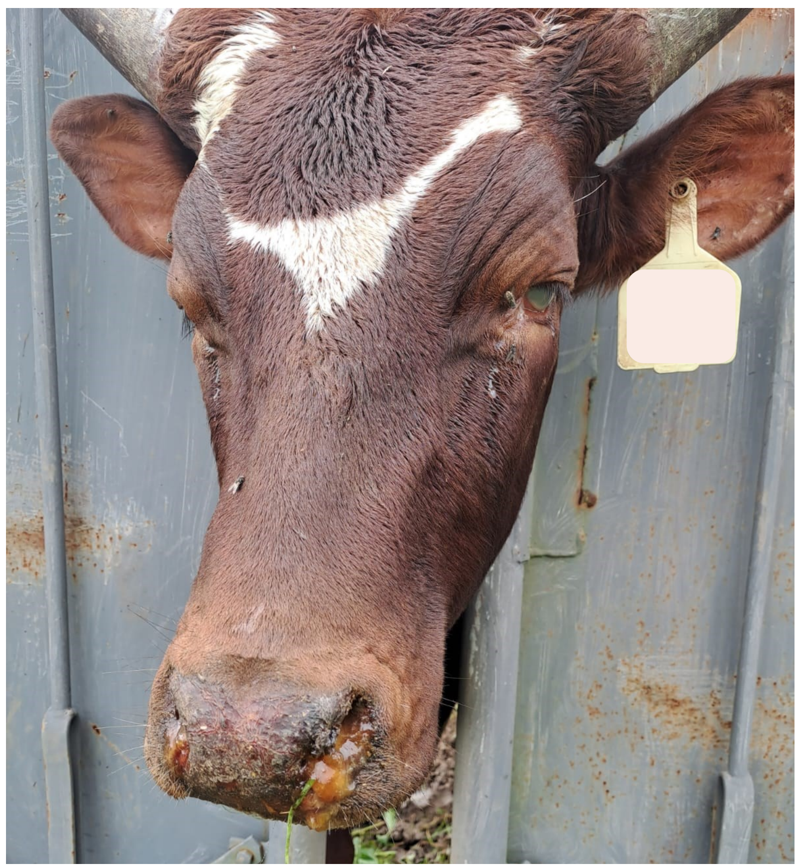

Figure 3: **a cow showing clinical signs of bovine malignant catarrhal fever** (Photo: A. Kidd)

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Previous reports are available at https://www.elsenburg.com/vetepi