NEW ZEALAND DECLARES FREEDOM FROM EQUINE VIRAL ARTERITIS (EVA) TO THE OIE

Self-declaration of New Zealand's freedom from equine arteritis virus (EAV), the cause of equine viral arteritis (EVA), was submitted to the OIE on 24 June 2014 by Dr Matthew Stone, Director Animal and Animal Products and Delegate to the OIE, Ministry for Primary Industries, Wellington. This declaration concludes the control programme initiated in 1989.

HISTORY OF EQUINE VIRAL ARTERITIS IN NEW ZEALAND

EAV was first determined to be present in horses in New Zealand in 1988. The release of the virus was considered to have occurred from horses imported from North America. A serological survey carried out in 1989 showed that the virus had been circulating widely in the Standardbred sector, with 54 percent of Standardbreds testing serologically positive (95 percent CI; range 45–63 percent). A low level of seropositivity (3 percent) was also detected in the Thoroughbreds using the virus neutralisation test (VNT) to antibody for EAV.

IMPLEMENTATION OF CONTROL MEASURES FOR EVA IN NEW ZEALAND

In 1989, soon after first detection of EAV, the disease was made notifiable in New Zealand and an EVA control scheme implemented. The ultimate aim was to eradicate the disease from the horse population in New Zealand. The main component of the scheme was serological testing of breeding stallions, with additional virus culture of semen in cases where the stallion was serologically positive. The scheme involved a number of controls on the use of carrier stallions and included quarantine of inseminated mares.

An estimate of the seroprevalence in New Zealand was updated in 1990 from the results of testing additional stallions under the EVA control scheme. At this time 3 percent (95 percent CI; range 1–5 percent) of Thoroughbred and 37 percent (95 percent CI; range 31–43 percent) of Standardbred stallions were seropositive to EAV using the VNT. Low VNT titres were obtained from the Thoroughbred stallions tested and very high titres from the Standardbreds. All seropositive Thoroughbred stallions were semen-tested using virus culture and none were found to be carriers of EAV. There were no seropositive stallions detected from 121 horses of other breeds tested (95 percent CI; range 0–4 percent). The scheme broke down during the period 1997–98 when a Standardbred stallion previously confirmed as free of EAV, and which had stood at the same stud as a carrier stallion, was determined to be semen-test-positive. It was determined that semen from this stallion had been inadvertently used to service mares outside of the required quarantine regime. A traceback of contacts identified only this one additional carrier stallion. Consequentially the scheme was modified by incorporating controls for the use of semen from shedder stallions and vaccination for EVA of stallions standing alongside carrier stallions.

A summary of testing carried out as part of the EVA control scheme in 2002 showed that from 1989 to 2002, despite the breakdown in 1997–1998, the programme had been effective, with a declining seroprevalence in the horse population as well as a reduction in the number of known EAV carriers. The number of carrier stallions declined from a maximum of 20 in 1991–1992, to three in 2002. In June 2012 the last EAV carrier stallion was euthanased at the age of 20. No stallion known to be a carrier of EAV remains in New Zealand. Clinical signs of disease have not been observed in horses in New Zealand since EVA was first diagnosed in 1988.

EVA MONITORING AND SURVEILLANCE

EVA is a Notifiable Disease under the Biosecurity Act 1993.

TOTAL SEROLOGICAL TESTING

There were 7157 EAV serological test records available for analysis for the seven-year period of interest from January 2005 to November 2011 (McFadden *et al*., 2013). Of these data 283 were from stallions tested as part of the EVA scheme, 6598 were from import/export tests and 276 were from transboundary animal disease (TAD) investigations. An additional 48 records from mares used for test mating of seropositive stallions to confirm their carrier status were not included in this analysis.

There were 29 horse breeds represented in the data. Some of these were not specific breeds but groups of breeds or type of horse, e.g., equestrian, sport horse, Warmblood or Polo pony. The median number of horses within these breed groups was seven (minimum one, maximum 5369). After categorisation of breeds into three categories, the sample size was sufficient to detect a seroprevalence of 1.7 percent or less for each category (**Table 1**).

EVA CONTROL SCHEME

Over an 11-year period (2001–2011) the status of 465 stallions were found to be negative as part of the EVA control scheme. The status of stallions was determined to be negative either through serological testing (n=389) or from negative virus culture of semen where stallions were serologically positive as a result of vaccination (n=93). After categorisation of the 465 stallions into three breed categories, the sample size was sufficient to detect a seroprevalence of between 3 and 9 percent of stallions for the three categories (**Table 2**). The majority of tests for the 'other' category were from the Appaloosa (25 percent, 45/181) and Quarterhorse breeds (36 percent, 65/181). From the 'other' category there were 27 breeds of stallions that had been tested as part of the EVA control scheme. As part of the scheme any stallion found to have positive serology was semen-tested.

The EVA control scheme allowed post-service serological testing of previously seronegative mares if a semen sample could not be collected from a seropositive stallion to determine its EAV shedder status.

In total 93 (20 percent, 93/465) stallions were semen-tested and determined to have a negative virus culture for EAV. Of these, 46 percent (43/93) had been semen-tested in multiple years. Where breed was identified, 93 percent (83/89) of semen samples were from Standardbred stallions, indicating a high rate of vaccination in this breed and therefore the more frequent need to use virus culture as a method of exclusion.

TABLE 1: SUMMARY OF VNTS FOR EQUINE VIRAL ARTERITIS FROM SERUM COLLECTED FROM HORSES GROUPED INTO BREED CATEGORIES, JANUARY 2005–NOVEMBER 2011[1]

BREED CATEGORY	NUMBER TESTED	CONFIDENCE LIMITS AROUND A ZERO PREVALENCE (%)
Thoroughbred	5 369	0–0.1
Standardbred	344	0–1.6
Other (equestrian/sport/ recreation	826	0–0.7
No breed criteria	618	0–0.9
Total	**7 157**	**0–0.1**

[1]Serological data analysed included data from horses tested as part of import and export requirements, the New Zealand EVA control scheme and from transboundary animal disease investigations.

TABLE 2: SUMMARY OF BREED CATEGORIES OF STALLIONS TESTED UNDER THE EVA CONTROL SCHEME, 2001–2011

BREED CATEGORY	NUMBER TESTED	CONFIDENCE LIMITS AROUND A ZERO PREVALENCE (%)
Thoroughbred	57	0–9
Standardbred	117	0–5
Other (equestrian/sport/ recreation	181	0–3
No breed criteria	110	0–4
Total	**465**	**0–1**

TRANSBOUNDARY ANIMAL DISEASE (TAD) INVESTIGATIONS

During 2005–2011 there were 84 equine TAD investigations carried out to exclude EVA. While some of these were initiated because of positive serology, the majority were initiated because of suspicious clinical signs or haematological findings in the affected horse/s. For investigations initiated on these grounds, more notifications were received from the regional veterinary laboratories (74 percent, 48/65) compared to private veterinarians (26 percent, 17/65).

The array of clinical signs apparent in animals where an investigation was undertaken was reviewed. A similar proportion of cases had clinical oedema (55 percent, 38/69) and anaemia (45 percent, 31/69) alone, while 14 (20 percent, 14/69) had both these changes. A small number were reported with respiratory signs (18 percent, 9/49) or a history of recent abortion (8 percent, 6/71). Nineteen horses (30 percent, 19/64) were recorded as being pyrexic, while 37 (54 percent, 37/68) had inflammatory changes evident on a leucogram. Most investigations (91 percent, 70/77) concerned a single affected horse at a property but seven investigations were on properties with more than one animal affected. (The change in the denominator presented in these figures reflects missing data on the presence of clinical presentation in affected horses from some investigations).

The median age of affected horses was four years (mean 6.9 years; range four months to 35 years). The majority of cases investigated were in males (geldings, colts and stallions: 63 percent, 48/76). Of the 56 horses where breed was recorded, there were 35 Thoroughbreds, 11 Standardbreds, four warmbloods, two Arabians, two Clydesdales, one Appaloosa and one Shetland pony.

EVA was excluded from all investigations undertaken.

Where serological results for EAV initiated the investigation, various methods were used to exclude exposure to EAV, including determining vaccination history, re-testing seropositive horses and testing in-contact horses. For stallions, semen testing by VNT and/or PCR was undertaken. In all cases it was determined that these titres were due either to cross-reactions or vaccination before importation to New Zealand. There were 276 sera tested for EAV as part of these TAD investigations, with no evidence of seropositivity to EAV in any horse investigated.

The minimum requirement for horses and equine semen imported into New Zealand is to comply with the requirements of the OIE Terrestrial Animal Health Code for EVA (Chapter 12.9).

VACCINATION

Vaccination of horses for EVA for the purposes of export only is allowed in New Zealand. New Zealand regularly imports stallions for breeding purposes and most of these are vaccinated in their country of origin prior to arrival here. Maintenance of vaccination status enables these horses to be re-exported if sold or being shuttled to studs in other countries. Many New Zealand horse studs export semen. The import health conditions of the importing countries require records showing maintenance of vaccination for EVA as per the manufacturer's recommendations. For this reason, stallions that commence EVA vaccination will have maintained their vaccination status for export purposes. The last year horses were vaccinated in New Zealand for the purposes of disease management was 2003. The last shedder stallion died in 2012.

NEW ZEALAND'S GENERAL SURVEILLANCE SYSTEM

During the time following the described analysis and up to the present time (from 2012 to 2014), the Animal Health Laboratory (AHL) performed 3627 serological tests for EAV. These included 35 exotic disease investigations that accounted for 41 samples, and 3586 samples tested for animal movement purposes (**Table 3**). When routine

import or export testing resulted in a positive serological test result and led to the initiation of a TAD, the methods described above were employed. EAV was excluded in all investigations during that period.

Therefore, considering that:

- no new infections with EAV have been detected for over a decade;
- for this period ongoing import health controls, surveillance and the infection with EAV control scheme measures have prevented further new cases from occurring and provided a means of detecting evidence of EAV if it was present;
- analysis was carried out on the three surveillance streams and serological test data concluded that exposure of horses to EAV if present was less than two percent within each breed category;
- the New Zealand EVA control scheme has focused on detecting and isolating carrier stallions responsible for venereal transmission;
- EVA is a notifiable disease and general serology data supported by TAD investigations have been used to show absence of any transmission in the general horse population; and
- no vaccination has been undertaken for disease control purposes for 10 years,

in accordance with Chapter 2.5.10 of the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* 2014 and Chapters 1.4, 1.6, and 12.9 of the *Terrestrial Animal Health Code* (2013), the Delegate of New Zealand to the OIE self-declared freedom from Equine Viral Arteritis on 24 June 2014.

REFERENCE

McFadden AMJ, Pearce PV, Orr D, Nicoll K, Rawdon TG, Pharo H, Stone M (2013) Evidence for absence of equine arteritis virus in the horse population of New Zealand. *New Zealand Veterinary Journal* 61(5) 300–304

Trish Pearce
Equine Health Association
pearce.patricia@gmail.com

Andrew McFadden
Incursion Investigator
Surveillance and Incursion Investigation (Animals and Marine)
Ministry for Primary Industries
Andrew.Mcfadden@mpi.govt.nz

Mary van Andel
Incursion Investigator
Surveillance and Incursion Investigation (Animals and Marine)
Ministry for Primary Industries
mary.vanandel@mpi.govt.nz