ARBOVIRUS SURVEILLANCE PROGRAMME

Introduction

The arbovirus surveillance programme was instigated in 1991 to provide assurance of New Zealand's freedom from arboviruses, particularly bluetongue virus, which affects sheep and cattle. Other arboviruses of veterinary concern include epizootic haemorrhagic disease virus, Akabane virus and Palyam (D'Aguilar) virus.

Arboviruses are taxonomically diverse but their general characteristics include that they infect vertebrates. They replicate in and are spread by biting midge vectors of the genus *Culicoides* (Diptera: Ceratopogonidae) (Ryan *et al*., 1991). In New Zealand, *C. brevitarsus* and *C. wadai* are of particular importance owing to their tolerance of colder environments (Ryan *et al*., 1991).

The surveillance strategy has three components:

- an early warning system for reporting suspicious cases;
- sentinel herd testing; and
- insect vector surveillance.

Early warning system

The Ministry for Primary Industries maintains an exotic pest and disease hotline that enables early reporting of suspected new to New Zealand pests and diseases. Exotic terrestrial animal pest and disease investigations are managed by MPI's Investigation and Diagnostic Centre (IDC), Wallaceville.

Sentinel herd testing

In the 2012–2013 arbovirus surveillance programme blood was collected from 16–18 cattle from each of 17 established sentinel cattle herds (**Figure 1**). These herds are located in districts that are considered to be most favourable for survival and establishment of *Culicoides* spp. that may arrive in New Zealand. Blood samples were taken for serological testing prior to December 2012, and after the possible period of virus transmission (June 2013).

Insect vector surveillance

On 10 of the 17 sentinel cattle farms, light traps that attract *Culicoides* spp. were placed adjacent to the herd (**Figure 2**). For the first time this season green light-emitting diodes (LEDs) were used in the traps. Previously the programme used incandescent white light bulbs, but studies in Australia have indicated a far greater trapping efficiency with green light (Bishop *et al*., 2004 and 2006).

Figure 1: Location of blood sampling and light trapping for *Culicoides* midges, 2012–2013

Insect vector surveillance is undertaken from the start of February until the end of April each year, during which period conditions are considered to be most favourable for *Culicoides* spp. activity. Ideal trapping nights are when the overnight temperature remains above 14°C. Traps are not deployed during weeks of the full moon, whose light would compete with the light attractant.

The light traps are run on three consecutive nights of each selected week.

Figure 2: Typical green LED light trap with suction fan that draws insects into a jar of ethanol at the base of the trap. Photo: Peter Goldsbury, AsureQuality.

Test results

The aim of sentinel herd testing is to detect serological evidence of exposure to bluetongue, epizootic haemorrhagic disease, Palyam (D'Aguilar) and Akabane viruses. All blood samples sent to the Animal Health Laboratory, Wallaceville, tested negative for antibodies to bluetongue virus, epizootic haemorrhagic disease virus and Palyam virus using the agar-gel immunodiffusion test. They also tested negative to the Akabane virus by the virus neutralisation test.

In all, 99 insect trap samples were received from AsureQuality field staff in 2013. Samples were processed by the Plant Health and Environment Laboratories of IDC in Auckland and Christchurch. A total of 148 762 insects were trapped (21 percent more than last season), but no *Culicoides* spp. were found. The number of native midges in the family Ceratopogonidae trapped greatly increased from last year, from 19 to 73 (up 26 percent). While this suggests that the traps are likely to trap *Culicoides* spp. if these are present, it also implies that the use of green LEDs has improved the sensitivity of vector trapping.

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