

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) that affect sheep and cattle. Other arboviruses of veterinary concern include epizootic haemorrhagic disease virus, Akabane virus and bovine ephemeral fever virus.

Arboviruses are taxonomically diverse but their general characteristics include infection of vertebrates. They replicate in and are spread by insect vectors in the biting midge genus *Culicoides* (Diptera: Ceratopogonidae). New Zealand is the only place in the world apart from Antarctica where the *Culicoides* genus is not present. However, there is a low likelihood that the route of introduction to New Zealand would be through windborne dispersal of the vector species *C. brevitarsis* from Australia owing to its wider distribution, high abundance and documented dispersal capability (Burgin *et al.*, 2013). Studies of other arthropod incursion events suggest that *C. brevitarsis* could be blown from Australia to New Zealand in the predominant westerly winds of the region (Burgin *et al.*, 2013).

In New Zealand, *C. brevitarsis* and *C. wadai* are of particular importance owing to their tolerance of cooler environments (Ryan *et al.*, 1991) and are likely to establish in some parts of New Zealand.

The surveillance strategy has three components:

- an early warning system for reporting suspicious cases;
- herd testing; and
- 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. This can be used to report suspicious cases of diseases in farm animals. Exotic terrestrial animal pest and disease investigations are managed by MPI's Diagnostic & Surveillance Services Directorate, Wallaceville.

Herd testing

During 2018 blood was collected from 640 cattle on 32 farms in four districts that are considered to be most favourable for survival and establishment of *Culicoides* spp. (Figure 1). These are

the areas where cattle would most likely be infected if the vector was present. Blood samples were taken for serological testing after the possible period of virus transmission.

Vector surveillance

Light traps for vector surveillance have been placed in areas around New Zealand where wind-blown dispersal and subsequent establishment are likely. The traps attract the winged adult midges as they fly during dawn and dusk. They also catch other insects that are of no consequence. Catches are examined under a microscope to confirm absence of *Culicoides* spp.

Twelve light traps with green LEDs (Bishop *et al.*, 2004, 2006) were deployed this season on cattle farms. In addition, two traps containing the attractants carbon dioxide and octenol were tested for comparison. Vector surveillance was undertaken from February to April inclusive, the period during which conditions are considered most favourable for midge activity. Ideal trapping nights are when the overnight temperature does not fall below 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.

Insect samples were processed by MPI's Plant Health and Environment Laboratories (Auckland and Christchurch) in early 2018. It was estimated that 285 464 insects were screened, but no *Culicoides* spp. were found. There were 135 native midges (Ceratopogonidae) trapped, which suggests that the traps would catch *Culicoides* species if they were present this season.

Blood test results from the 2017 surveillance season

The aim of herd testing is to detect serological evidence of exposure to bluetongue, epizootic haemorrhagic disease, Akabane and bovine ephemeral fever viruses. All 640 blood samples sent to the Animal Health Laboratory

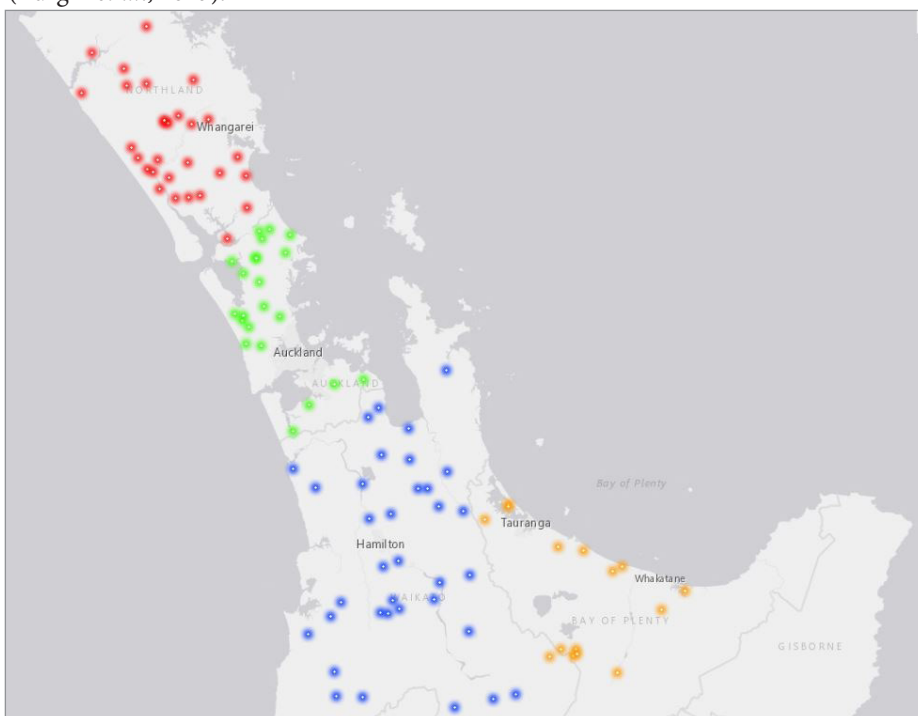


Figure 1: Animal sampling for arbovirus in 2018 (red = animals sampled from farms in Northland; green = Auckland; blue = Waikato; orange = Bay of Plenty)

(Wallaceville) in 2017 tested negative by ELISA for antibodies to these viruses. Results from the blood samples collected in 2018 will be confirmed in 2019.

References

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