NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER – OCTOBER 2019

WELCOME!

Kia Ora Koutou,

We are feeling very thankful this month here at the Lab. The Pest and Vector Workshop in Auckland allow us to meet in person many great HPOs and hear from their experiences and offer some new Surveillance updates. The lab also conducted the pilot visit to Toi Te Ora – Public Health as part of a series of visits to Points of Entry to help put into place the recommendations that were made in the 2019 Surveillance Review. The visit was very informative and we look forward to visiting the rest of the Public Health Units.

Also, Peter Haslemore from Southland has sent some larvae to the Lab to try to obtain some *Culiseta novaezealandiae* adults, a very rare native species. So far, these mosquitoes have remained elusive however we hope that future sampling will be more successful. In the meantime, we will enjoy being able to add more *Culex pervigilans* specimens to our reference collection.

In the news this month, read about how *Anopheles* mosquitos are able to travel much further than previously thought by using wind currents and how the malaria parasite that they carry was able to host switch from gorillas to humans. Also learn about how *Aedes* mosquitos are more likely to choose clusters of standing water to lay their eggs, how another piece of the puzzle of how DEET works has been uncovered, and how France has had three cases of Zika virus that were locally acquired.

SURVEILLANCE

During October, 1253 samples were collected by staff from 12 DHBs with 83 positive larval samples and 14 adult samples, leading to a total of 23 adults and 3685 larvae identified over the past month (Table 1). The dominant larval species this month, and this month last year was *Aedes notoscriptus.*

Compared to this same month last year, the total number of larvae have shown an increase and adult mosquitoes have shown a decrease (4% and 13% respectively) (Table 1).
In total, six mosquito species have been collected this month (Table 1), that is two more than last month. Auckland DHB and MidCentral DHB detected the highest number of mosquito species, which was 4 (Figure 1).

Compared to last month, mosquito larvae have shown an increase (132%), and adults have been collected this month, while last month they were absent.

Table 1. Adult and larvae sampled by the New Zealand surveillance program during October 2018 & 2019

Species (common name)	Adults		Larvae	
	Oct 19	Oct 18	Oct 19	Oct 18
Aedes antipodeus (winter mosquito)	7	2	1	-
Ae notoscriptus (striped mosquito)	-	-	2799	2906
Ae subalbirostris (no common name)	-	-	7	-
Ae australis (saltwater mosquito)	-	-	-	1
Culex pervigilans (vigilant mosquito)	8	11	630	608
Cx. quinquefasciatus (southern house mosquito)	6	11	216	17
Culex sp. (missing their abdomens, likely to be *quinquefasciatus* or *pervigilans*)	2	2	-	-
Opifex fuscus (rock pool mosquito)	-	-	32	23
Total	**23**	**26**	**3685**	**3555**

The highest number of larvae sampled this month was Northland DHB (2779), followed by Public Health South DHB (296) (Figure 1).

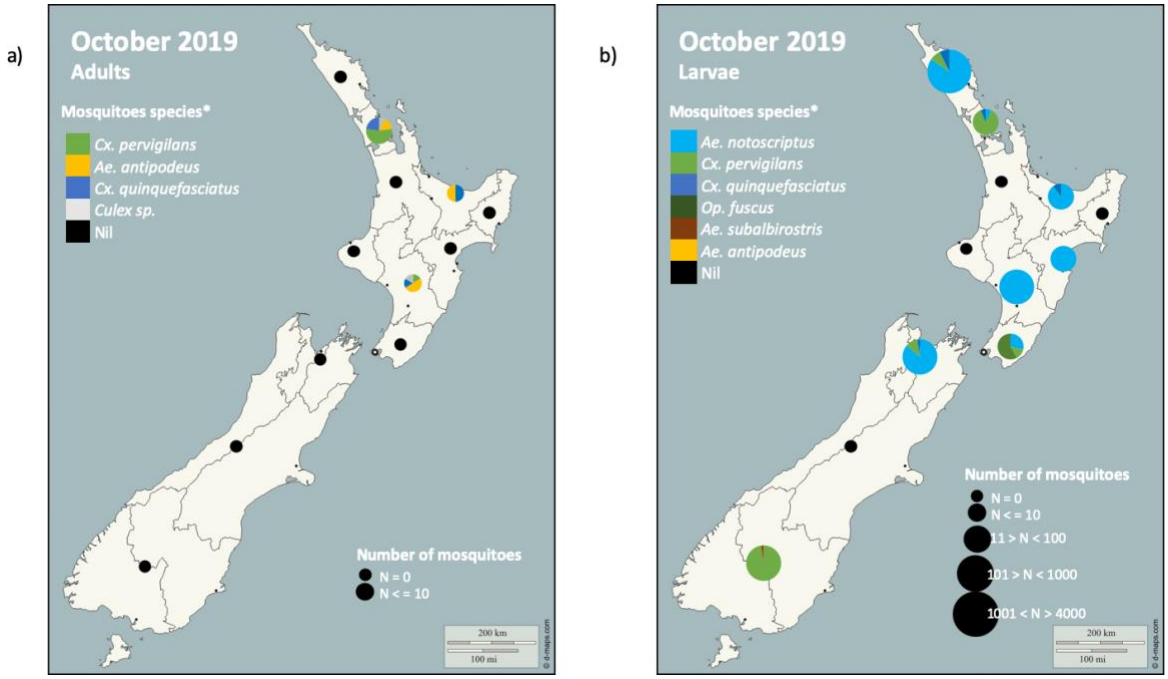


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the October 2019 surveillance period.
* The mosquito species are listed in order from the most abundant to the least abundant.
Please note that the markers represent the DHBs and not the specific sites where the samples have been taken.

As expected *Aedes notoscriptus* has not been recorded this month, this year or last year in Public Health South (Figure 2).

Aedes notoscriptus larval numbers have shown an increase in seven DHBs from this same month last year but was absent in Community and Public Health, Waikato DHB and Taranaki Health (Figure 2) this year.

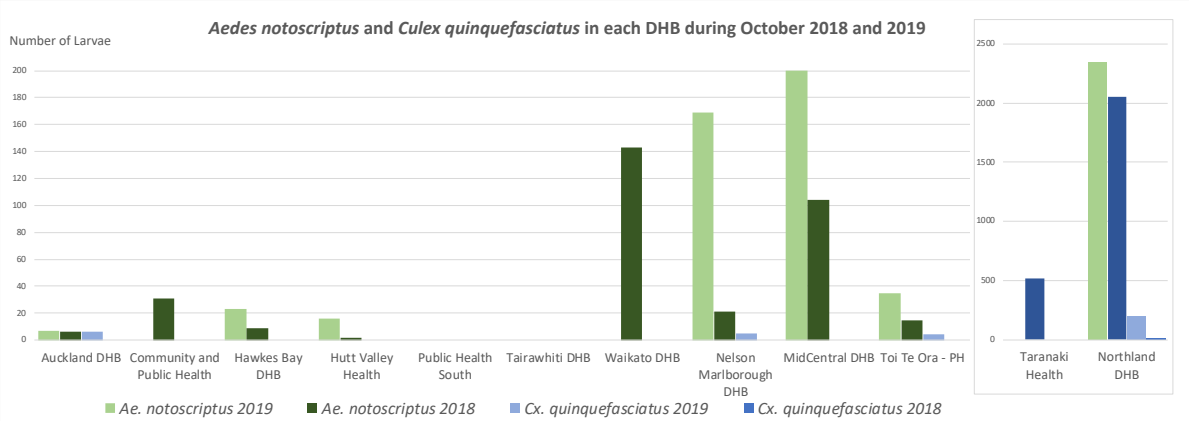


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during October 2018 and 2019.
*Please note the different scale for the number of larvae present in Northland and Taranaki in comparison to the other DHBs.

Culex quinquefasciatus larval numbers have shown an increase in Northland DHB from this same month last year and were collected this year in Auckland DHB, Nelson Marlborough DHB and Toi Te Ora – PH (Figure 2).

Disclaimer: Note that all comparisons made have not been statistically tested and can be due to sampling effort.

INCURSIONS AND INTERCEPTIONS

During October eight suspected interceptions have been recorded. (Table 2). Please note that the detections of exotic mosquitoes are highlighted in light blue.

Table 2. Suspected interceptions during October 2019

Date	Species	Location	Circumstances
29-10-2019	1 non-mosquito	Freshmax Mt Wellington, Auckland	Found dead attached to a melon in a shipment from Australia
23-10-2019	1 male *Culex* aff *hutchinsoni*	Profreight TF, Mangere, Auckland	Found alive in a container of pet food that had come from France via Singapore
15-10-2019	1 male *Culex quinquefasciatus*	Car Haslam Ltd, Mt Wellington, Auckland	Found dead on the passenger seat of a car from Fiji
11-10-2019	1 non-mosquito	Value Tyres Ltd (VTL), Otahuhu, Auckland	Found inside a shipping container of new tyres from Tanjung, China
10-10-2019	1 non-mosquito	Allied Pickfords, Mt Wellington, Auckland	Found dead inside an imported vehicle from Australia
10-10-2019	1 non-mosquito	Canterbury Spinners Ltd, Dannevirke, Manawatu	Found dead in a container of wool from Melbourne. A suspected mosquito escaped from the container
10-10-2019	1 Female *Aedes australis*	Christchurch International Airport	Found dead in a tent that had been used for camping from Queensland to Victoria
06-10-2019	1 Female *Culex torrentium*	FoodStuff TF, Christchurch	Found dead in a container of frozen goods from Belgium

NEWS ARTICLES FROM AROUND THE WORLD

Windborne mosquitoes may carry malaria hundreds of kilometres

A female *Anopheles gambiae* mosquito—a species that carries the malaria parasite in Africa LONDON NATURAL HISTORY MUSEUM/SCIENCE SOURCE

Conventional scientific wisdom has long held that mosquitoes have a limited range: They fly low to the ground and typically travel less than 5 kilometres during their brief lifetimes. Now, researchers have turned that wisdom on its head. In the Sahel, the semidesert region just south of the Sahara Desert, malaria-bearing mosquitoes are borne on winds that allow them to travel hundreds of kilometres—and as high as 290 meters above the ground—in a single night. Read more.

Common bug repellent may chemically 'cloak' humans from malaria-carrying mosquitos.

Anopheles mosquito antennae in apparatus used in these experiments. Credit: Christopher Potter

The exact method which DEET and other repellents work is still unknown, though there are several theories, and past experiments have given some pieces of the puzzle. Studies on *Aedes* and *Culex* species have shown that it is likely a combination of olfactory and chemical cues working together to mask the smell of human skin and stop the mosquito landing on the skin, however not a lot of work has been done with *Anopheles*. The team used genetic engineering to allow them to visualise the repellents interacting with the mosquito's antennae, as the neurons would fluoresce when stimulated. They found that while there was

a large response to human scent, there was no response to DEET, and that when DEET was mixed with human scent, the response was significantly decreased. Read more. Read the original article.

France Confirms 3rd Local Zika Case

Hyères City in France has had 3 locally acquired cases of Zika Virus. All of the cases occurred within close vicinity of each other and none had travel history to Zika-endemic countries. While there have been several cases of Zika virus in France related to international travellers, ECDC believe this is the first report of the transmission of Zika virus by *Aedes albopictus* mosquitoes in Europe. Read more.

Mosquitoes more likely to lay eggs in closely spaced habitats

One of the research sites with closely spaced cups.

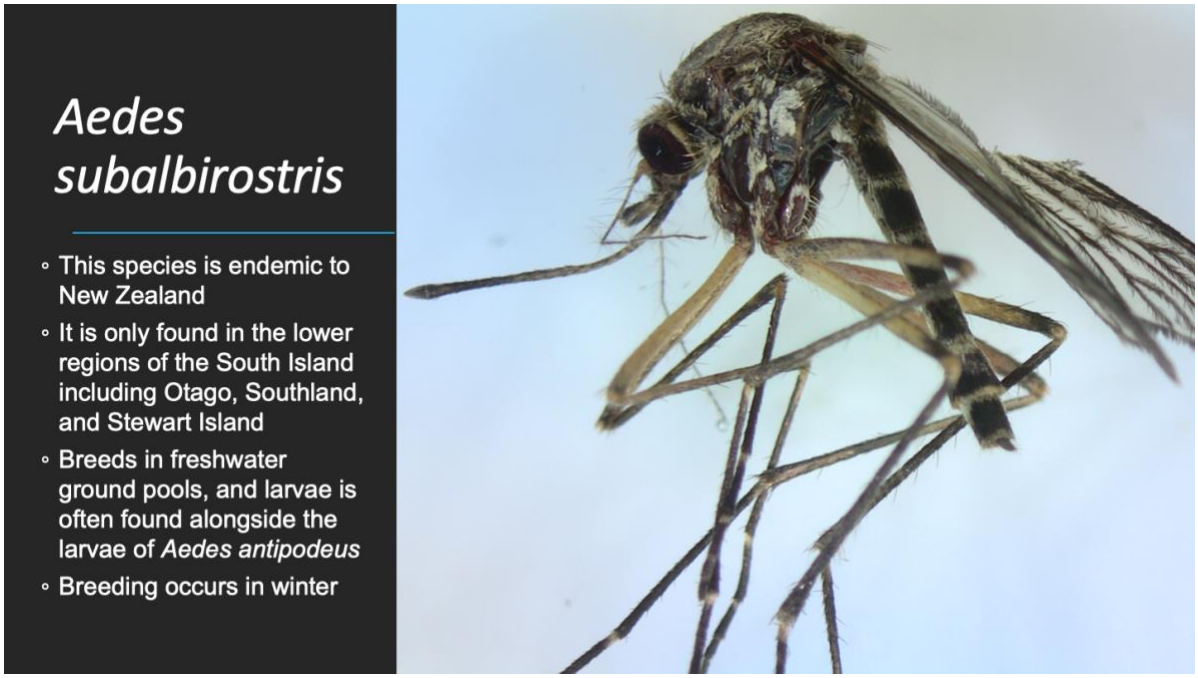
Researchers at the University of Georgia have found that *Aedes* mosquitos were more likely to lay their eggs in patches of standing water that were clustered together than ones that were further apart. The study used plastic cups of water arranged in clusters with five cups a meter away from a central cup or dispersed with five cups 20 meters away from the central cup. It was found that areas containing the clusters of cups were visited at least six times more than the same sized area surrounding one of the dispersed cups. Of the two species of *Aedes* which were represented in the study, *Aedes albopictus* (an introduced species) showed a stronger response to than *Aedes triseriatus* (an endemic species). Read more. Read the original article.

Scientists discover how malaria switched host from African gorillas to humans

A female *Anopheles albimanus* mosquito while she was feeding on a human host (Credit: James Gathany Content Providers(s) CDC Public Health Image Library)

Scientists have discovered the gene and mutation that allowed the malaria parasite *Plasmodium falciparum* to host switch from gorillas to humans, and the mutation that caused the parasite to then become restricted to humans. They believe that this switch occurred approximately 50,000 years ago and that this discovery could help create new ways to fight malaria. The gene encodes a protein known as RH5 which binds to a receptor on human red blood cells and could be used as to design vaccines. Read more. Read original article.

KNOW YOUR MOSQUITO



KNOW YOUR MOSQUITO TRAP

Gravid *Aedes* Trap (GAT)

What mosquito does it attract?

- Attractive to gravid (egg bearing) female *Aedes aegypti* and *Aedes albopictus*.

How does it work?

- Gravid females are attracted to the water inside the black bottom of the trap as well as the black colouring. Once inside, they get trapped inside the translucid cavity, which should be treated with insecticide, or have a sticky surface added.

Where should this trap be set?

- As the black colour of this trap attracts mosquitos from some distance, an ideal place is somewhere that the trap is visible but protected from the rain and weather.
- A shady and humid place which is attractive to mosquitos is ideal.

DISEASE OUTBREAKS

To find out where the latest disease outbreaks have occurred visit:

Epidemic and emerging disease alerts in the Pacific region - Produced by the Pacific Community (SPC) for the Pacific Public Health Surveillance Network (PPHSN).

World Health Organization – World Health Organization.

Public Health Surveillance - Institute of Environmental Science and Research (ESR) - Information for New Zealand Public Health Action.

Communicable disease threats report - European Centre for Disease Prevention and Control

RISK MAPS

Dengue Map – Centres for Disease Control and Prevention

Zika Map – Centres for Disease Control and Prevention

Malaria – Centres for Disease Control and Prevention