



BORDER HEALTH NEWSLETTER – JUNE 2019

WELCOME!

Kia Ora Koutou

Winter has finally arrived and the drop in temperatures has also brought about a significant reduction in positive samples across the country. As colder months are with us the “know your mosquito” segment this month is dedicated to the endemic species *Aedes antipodeus* that thrives in the winter months.

In the news this month scientists have discovered a neurotoxin that specifically targets *Anopheles* mosquitoes. Also read about how mosquito diet in the larval stage affects disease transmission and an interesting paper on the analysis of the costs of mosquito control vs medical costs of an outbreak. Then finally read about studies undertaken to find easier tests for detecting antimalarial drug resistances and the possibility of developing resistances to *Wolbachia*.

SURVEILLANCE

During May 708 samples were collected by staff from 11 DHBs with 43 positive samples. This included 16 adult samples and 27 larval samples, leading to a total of 24 adults and 1012 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 adults and larvae have shown a decrease. This month saw three less adult species collected in samples compared to this month last year (Table 1).

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

Species (common name)	Adults		Larvae	
	June 19	June 18	June 19	June 18
<i>Aedes notoscriptus</i> (striped mosquito)	1	13	471	808
<i>Aedes antipodeus</i> (winter mosquito)	-	1	-	-
<i>Aedes australis</i> (saltwater mosquito)	-	-	-	-
<i>Aedes subalbirostris</i> (no common name)	-	-	-	-
<i>Coquillettia iracunda</i> (no common name)	-	1	-	-
<i>Culex pervigilans</i> (vigilant mosquito)	-	13	100	32
<i>Cx. quinquefasciatus</i> (southern house mosquito)	23	27	386	218
<i>Culex</i> sp. (likely to be <i>quinquefasciatus</i> / <i>pervigilans</i>)	-	-	-	-
<i>Culiseta novaezealandiae</i> (no common name)	-	-	3	-
<i>Culiseta tonnoiri</i> (no common name)	-	-	-	-
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	52	41
Total	24	55	1012	1099

In total five mosquito species have been collected this month (Table 1), that is one less than last month. Hutt Valley Health DHB and Northland DHB detected the highest number of mosquito species (3 species; Figure 1).

Compared to last month larvae and adult mosquito numbers have shown a decrease (66% and 95% respectively).

There have been no positive adult samples from DHB sampling in the South Island this month and very few in the North Island, with adults collected only in MidCentral, Hawkes Bay and Auckland (Figure 1).

Northland DHB had the highest number of larvae this month (817), followed by Hutt Valley Health DHB (57) (Figure 1). Public Health South once again had *Culiseta novaezealandiae* which is a great find for an endemic species which has been very elusive in the past.

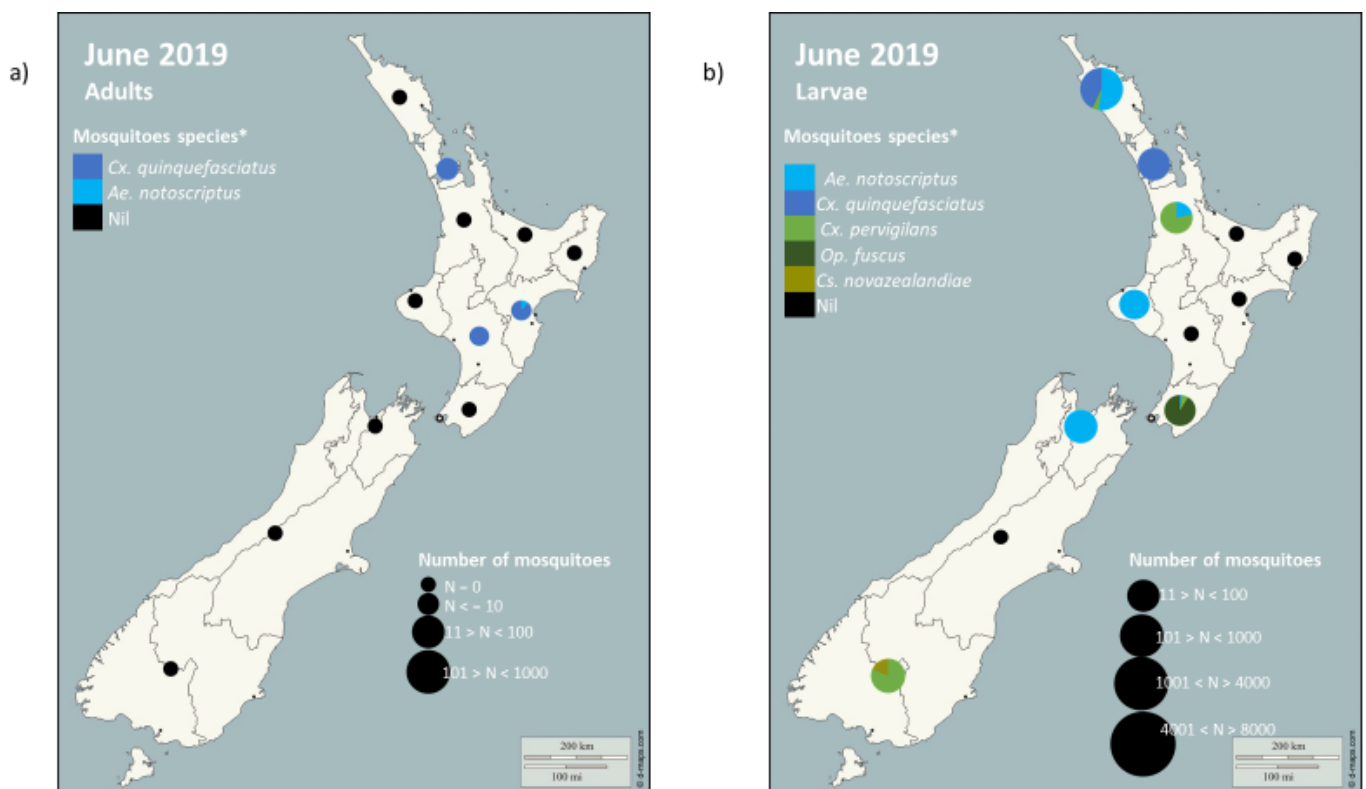


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the June 2019 surveillance period.

* 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.

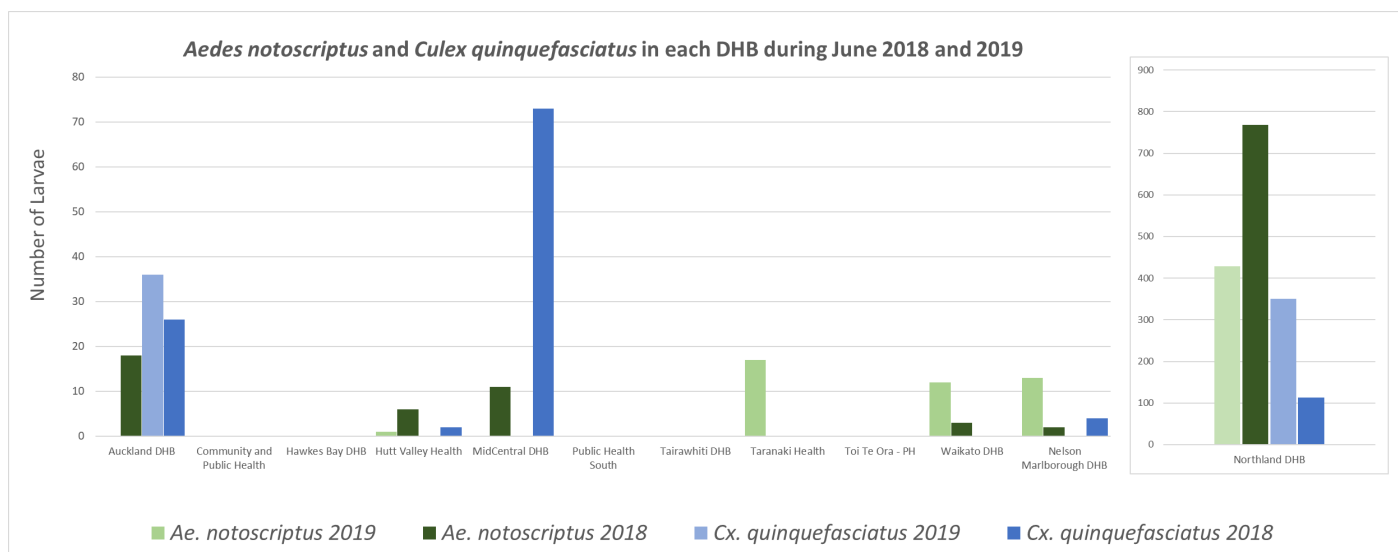


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during June 2018 and 2019. *Please note the different scale for the number of larvae present in Northland in comparison to the other DHBs.

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 three DHBs from this same month last year and a decrease in four DHBs (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in two DHBs from this same month last year a decrease in three (Figure 2).

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

INCURSIONS AND INTERCEPTIONS

During June, three suspected interceptions have been recorded (Table 2).

Table 2. Suspected interceptions during June 2019

Date	Species	Location	Circumstances
25-06-2019	1 Male <i>Culex quinquefasciatus</i>	Hellmanns Worldwide Logistics, Auckland	Found dead in a consignment of flowers from India
11-06-2019	5 non mosquito adults (Hymenoptera)	Menzies Aviation, Auckland	Found dead in a consignment of pomegranates
03-06-2019	2 Female <i>Culex quinquefasciatus</i>	MG Marketing, Penrose, Auckland	Found alive flying around the inspection room by MPI while checking a consignment of bananas



NEWS ARTICLES FROM AROUND THE WORLD

War against mosquitoes saves lives and money in Sri Lanka



Researchers performed an analysis to compare the costs of large-scale mosquito control in an area of Sri Lanka which has a high rate of dengue infection, to the medical costs related to dengue outbreaks at 25%, 50% and 75% hospitalisation levels. The mosquito control involved removal of breeding sites and consisted of 35 teams consisting of a Medical Officer of Health, a police officer and a military officer, each visiting and clearing approximately 50 sites per day. They found that at 50% and 75% hospitalisation levels in areas with a high occurrence of dengue, the cost of medical treatment and days lost due to dengue related illness outweighed the costs of large-scale mosquito control.

[Read a summary here, or the original article here](#)

Engineers crack the code to quickly diagnose anti-malarial drug resistance

Testing for antimalaria resistance is important to prevent it spreading, however it is a time consuming and complex task as it requires DNA extraction and PCR analysis. This research aimed to create a way to make this test more available and easier to use, particularly in areas with fewer resources. They did this by altering the dyes that are used in PCR analysis to be compatible with blood and detect resistance to the most common and powerful antimalarial, as well as the ability to be modified to accommodate future antimalarial drugs.

[Read a summary here, or the original article here](#)

Nitrogen-rich diet reduces mosquitoes' ability to transmit Zika

Mosquitoes that were fed a nitrogen rich diet as larvae were larger as adults and the Zika virus didn't spread throughout the mosquito's body as much as those who had a nitrogen poor diet as larvae. The study altered the amount of nitrogen in the habitat water to range from no nitrogen present to habitat water with high levels of nitrogen. The main limitation



was that the F17 generation from wild caught mosquitoes were used while an F1 generation from wild caught mosquitoes would be more representative of a wild population.

[Read more here](#)

Scientists identify malaria's Achilles' heel



Anopheles mosquito feeding (photo by James Gathany, CDC)

Scientists have discovered a clostridial-like neurotoxin in the same family of the toxin causing tetanus and botulinum that specifically targets *Anopheles* mosquitoes, the vector for malaria. They identified that the toxicity of *Paraclostridium bifermentans* strains was due to PMP1, a protein which shares a lot of similarities to the tetanus and botulinum neurotoxins. They found that the protein disrupts SNARE-mediated exocytosis in *Anopheles* mosquitoes but does not appear to affect non-target creatures. While further research is required to ensure that non target organisms won't be affected, *P. bifermentans* strains and PMP1 could be an environmentally friendly way to control *Anopheles* mosquitoes.

[Read a summary here, Or the original article here](#)

New study suggests bacteria-loaded mosquitoes may halt spread of Dengue fever

Wolbachia is a bacterium that stops the replication of many pathogens in a range of arthropod hosts, including *Aedes* mosquitoes which carry the dengue virus. It has been shown both in the lab and in field trials to stop viral replication in mosquitoes and stop the transmission of the virus, however there are concerns that the virus or the mosquitoes carrying it will become resistant to *Wolbachia*. This study tested to see if dengue 3 virus was able to develop a resistance to *Wolbachia*. They found that even after multiple replication cycles, *Wolbachia* remained effective in stopping the virus replicating. However, they do note that it is still possible for resistances to develop in the field.

[Read a summary here, or the original article here](#)



KNOW YOUR MOSQUITO



Aedes antipodeus (Winter mosquito)



- *Aedes antipodeus* is an endemic species to New Zealand.
- Adult females are active all year round with breeding mainly occurring in March – October, hence the name winter mosquito.
- Ranges from Kaitaia to Stewart Island and normally located in damp bush habitat.
- Will breed in shaded floodwater, ground pools, reservoirs, swamp margins and fringes of saltmarsh habitat.
- The Vector status of *Aedes antipodeus* is unknown.
- Reported to be a nuisance biter and will bite day and night, both indoors and outdoors.
- Found occasionally in routine samples, mainly in the colder months.



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

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