

BORDER HEALTH NEWSLETTER – AUGUST 2019

WELCOME!

Kia Ora Koutou

It was great to meet in person many HPOs during the Border Health and Ship Sanitation Course here in Wellington. We hope you enjoyed all the vector related activities as we certainly did.

In the news, this month scientists have discovered a hidden Zika outbreak in Cuba. A team of researchers have created the Malaria Cell Atlas. Also, read about how *Aedes albopictus* has spread from its native range to Europe. Then, read about how thyme oil and corn starch can be used to control mosquito populations. Finally, watch a WHO video about the current resurgence of dengue worldwide and the best ways to protect communities from infection.

This month in the Know your Mosquito section meet *Culex tritaeniorhynchus*, the main vector of Japanese Encephalitis in Asia.

SURVEILLANCE

During August, 884 samples were collected by staff from 11 DHBs with 49 positive samples. This included 4 adult samples and 45 larval samples, leading to a total of 3 adults and 1512 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 and adult mosquitoes have shown a decrease (38% and 5300% respectively) (Table 1).

In total four mosquito species have been collected this month (Table 1), that is two less than last month. Hutt Valley Health detected the highest number of mosquito species which was 4, followed by Auckland DHB and Northland DHB South with 3 (Figure 1).

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

Species (common name)	Adults		Larvae	
	Aug 19	Aug 18	Aug 19	Aug 18
<i>Aedes notoscriptus</i> (striped mosquito)	-	128	1398	1942
<i>Aedes antipodeus</i> (winter mosquito)	-	5	-	-
<i>Aedes subalbirostris</i> (no common name)	-	-	-	7
<i>Ae. Australis</i> (saltwater mosquito)	-	-	-	2
<i>Culex pervigilans</i> (vigilant mosquito)	2	12	53	59
<i>Cx. quinquefasciatus</i> (southern house mosquito)	1	17	49	47
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	12	33
Total	3	162	1512	2090

Compared to last month larvae have shown an increase (16%) while adult mosquito numbers have shown a 63% decrease.

Northland DHB had the highest number of larvae this month (1287), followed by Taranaki Health (146) (Figure 1).

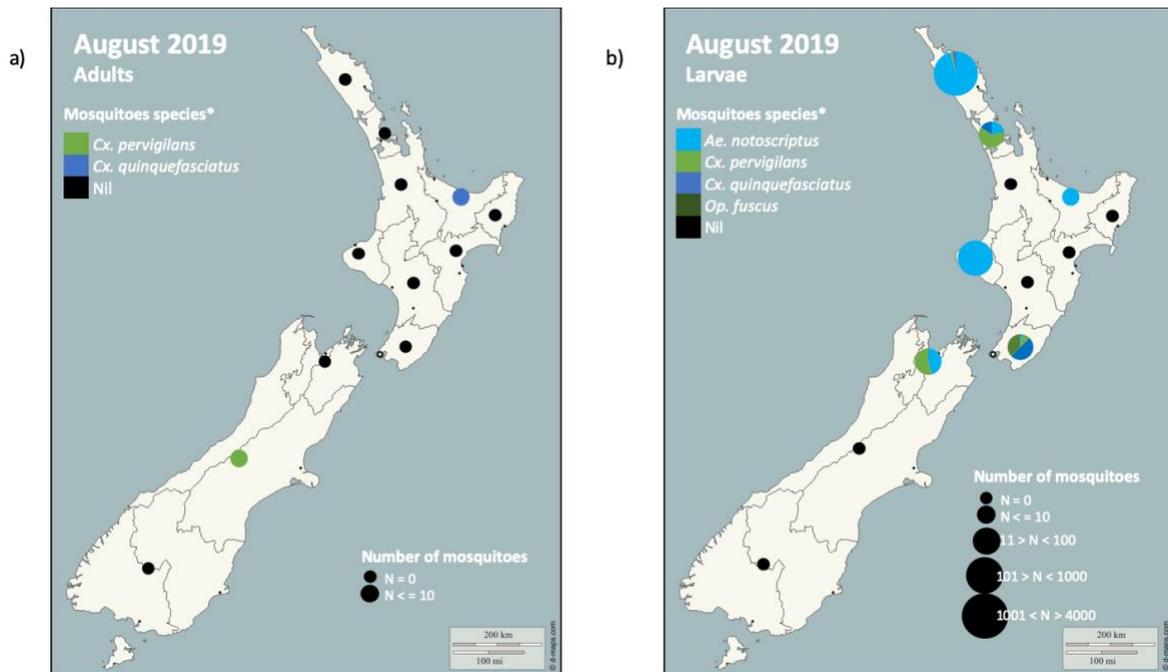


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the August 2019 surveillance period.

* 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.

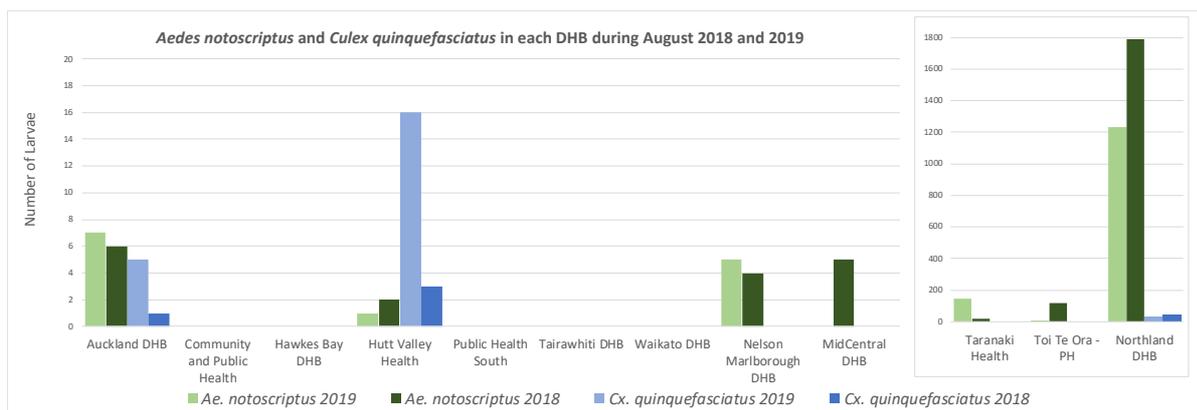


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during August 2018 and 2019. *Please note the different scale for the number of larvae present in Northland, Toi Te Ora – PH and Taranaki, in comparison to the other DHBs.

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 Taranaki Health, Nelson Marlborough DHB and Auckland DHB from this same month last year and a decrease in the Hutt Valley Health, Toi Te Ora – PH and Northland DHB (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in Nelson Marlborough DHB and Auckland DHB and a decrease in Northland DHB (Figure 2).

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

INCURSIONS AND INTERCEPTIONS

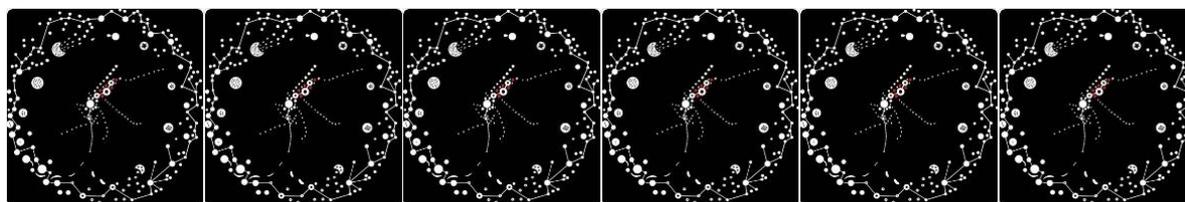
During August six suspected interceptions have been recorded. Interception of exotic mosquitoes of human health concern is highlighted in blue, other exotic mosquitoes in yellow and local mosquitoes in green (Table 2).

Table 2. Suspected interceptions during August 2019

Date	Species	Location	Circumstances
26-08-2019	1 Male <i>Culex (Culicomyia) bailyi</i>	Christchurch Airport	Found dead in the luggage of a passenger coming from Indonesia.
26-08-2019	10 non-mosquitoes	13 Rutherford St, Lower Hutt	Found dead attached to packing wrap of doors and windows from China.
23-08-2019	1 Female <i>Culex pervigilans</i>	Pengellys Ltd, 589 Halswell Junction Road, Christchurch	Found alive in a container of flat pack furniture from Malaysia.
12-08-2019	1 non-mosquito	AIAL International Arrivals Hall	Found alive.
05-08-2019	1 Female <i>Culex tritaeniorhynchus</i>	Pengellys Ltd, 589 Halswell Junction Road, Christchurch	Found dead in a consignment from China. No information about the cargo was available.
02-08-2019	1 Female <i>Culex pervigilans</i>	Pengellys Ltd, 589 Halswell Junction Road, Christchurch	Found alive in a consignment of dates from Malaysia.

NEWS ARTICLES FROM AROUND THE WORLD

Scientists create first detailed map of individual malaria parasite behaviour

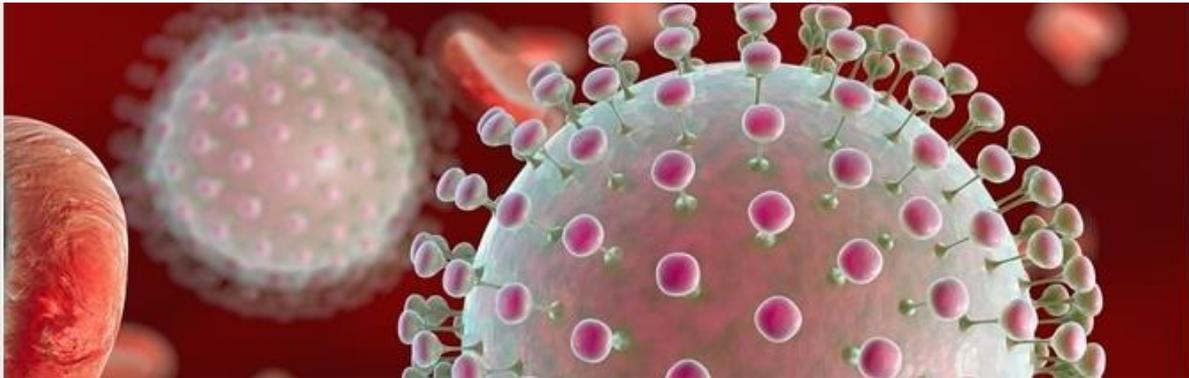


A team of researchers at the Wellcome Sanger Institute have created the Malaria Cell Atlas. This atlas is comprised of the gene expression of the malaria parasite at each stage of its life cycle. The team also looked at stages of the parasite where each of the genes is likely to play a role in the parasite's development. This breakdown of the malaria parasites gene expression will be useful in the development of antimalarial drugs and vaccines, as well as



helping create transmission blocking strategies. [Read a summary article here](#) or read the [original article](#) here.

Study shows urgent need for long-term follow up of Zika-exposed infants



Zika virus exposure during pregnancy can result in birth defects when the baby is born, with the most common being microcephaly, though not all babies born to mothers with a Zika infection will have these birth defects. A new study has found that while it may appear as though the infant has not been affected it is possible that neurodevelopment issues may become apparent later. Babies whose mothers had been infected during pregnancy with symptomatic infections were tested for their neurodevelopmental status between the ages of 7 and 32 months. 30% tested below average in one or more areas of brain development such as cognition, motor skills, and expressive language. This means that even if a baby appears normal at birth, they should be monitored as problems may develop in the future. The same study also found that some babies who displayed neurodevelopmental issues at birth tested normally at two to three years of age. [Read about it here.](#)

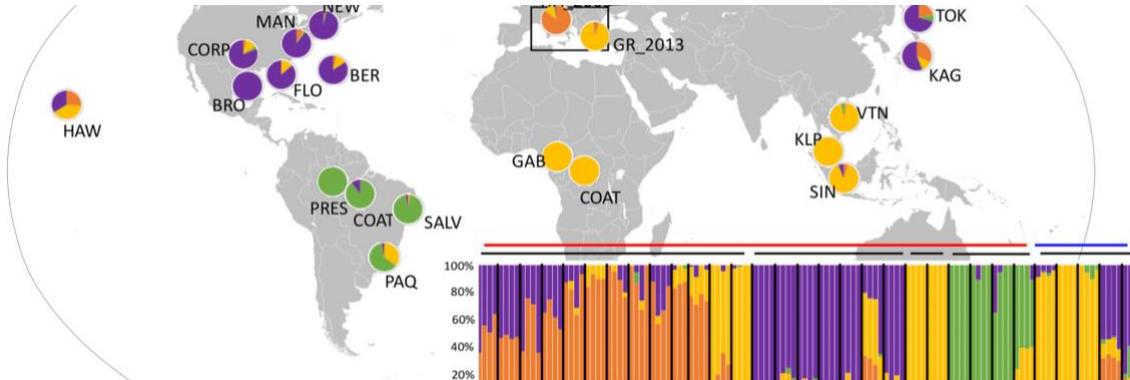
Can graphene help fight mosquito bites?



Graphene is an interesting substance which is stronger than steel, conducts both heat and electricity, and is invisible to the naked eye. Researchers at Brown University wondered if graphene would prevent mosquitoes being able to bite through light fabric clothing. The results can guide development of graphene protective technologies on skin or within smart fabrics. [Read about it here.](#)

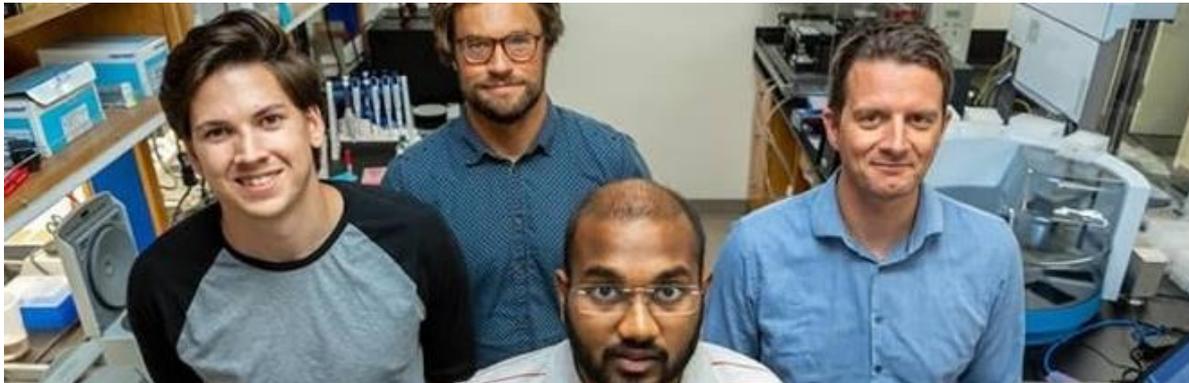


Genes tell the story of how the Asian tiger mosquito spread



Aedes albopictus has spread from its native range in South-East Asia to all over the world, largely through the transportation of its eggs via the international trade in used tires. This study looked at the genetics of the mosquito in Italy, as well as from Albania and Greece, to determine how the spread of this invasive mosquito occurred. The genetic data showed that multiple independent introductions were likely the cause of the expansion. The introductions were both from the native area of this species, as well as areas that this species had previously invaded, with human activities showing a major role in the process. [Read a summary here](#) or the [original article here](#).

Hidden Zika outbreak in Cuba uncovered by genomic sequencing and travel data



The Andersen lab at Scripps Research uses infectious disease genomics to investigate how pathogenic viruses such as Zika cause large-scale outbreaks.

A team of researchers found that there was an undetected and unreported outbreak of Zika occurring in Cuba. The outbreak was found through looking at blood samples from the travellers who were infected and isolated the viruses. These viruses were then studied and their genomic sequences were detailed. The researchers called this form of genetic investigation “genomic epidemiology.” The authors suggest that traveller data and health records could be used to detect outbreaks and prevent them spreading in the future. [Read a summary article here](#) or read the [original article here](#).



Watch: Q&A on dengue

Dr Eve Lackritz, WHO, speaks about the current resurgence of dengue world-wide and the best ways to protect individuals, homes, and communities from infection. Sharp increases in global dengue cases continue to be observed in 2019 compared to previous years. There are currently outbreaks of dengue in Asia, the Americas, and Africa. Mosquitos that spread dengue viruses, known as *Aedes aegypti*, also spread Zika, chikungunya, and yellow fever. Dengue seldom causes death, however, the flu-like symptoms can be very uncomfortable for the afflicted individual. [Watch the video.](#)

Thyme oil and corn starch prove deadly for mosquito larvae



Pupal *Aedes aegypti* mosquitoes in a lab. Copyright: [IAEA Imagebank](#) (CC BY-NC-ND 2.0)

The mosquito-repellent properties of thyme oil have long been known. But now a team of researchers in Sao Paulo, Brazil have harnessed the power of this humble herb to attack the insect's larvae before it can spread, using another common ingredient. They used corn starch, an abundant, cheap and biodegradable raw material, to develop microcapsules as a container to release thyme essential oil into the water. [Read more.](#)

KNOW YOUR MOSQUITO



Photo from:
https://www.fehd.gov.hk/english/pestcontrol/photo_page2/Culicidae/Culex%20tritaeniorhynchus.html

Culex tritaeniorhynchus

- Part of the *Culex vishnui* subgroup
- Main vector of Japanese encephalitis
- Native to northern Asia
- Larvae are commonly found in rice fields and other small collections of clean water around cultivated fields. They can also be found in marshes
- Prefers biting other animals to humans, though it does bite humans
- Can tolerate a wide range of temperatures, with the annual mean minimum and maximum temperatures in its home range being 8.2°C and 28.9°C respectively



THE BEST INTERCEPTION MOZZIE PICTURE OF THE MONTH



Male *Culex (Culicomyia) bailyi* found dead at Christchurch International Airport in the luggage of a passenger coming from Indonesia. By Angela Sheat.

Characteristics of a good Mozzie picture:

- Picture is in focus (in general a series of pictures are needed to gather enough information for preliminary ID)
- The light allows the viewer to interpret the different colours and patterns.
- All body parts are distinguishable.

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