NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER – MARCH 2020

WELCOME!

Kia Ora Koutou,

This month we would like to express our gratitude to all of you that are dedicating your time and effort to help protect us all from COVID 19. We also want to say a big thanks to the Public Heath Units wonderful people for keeping the mosquito surveillance program up and running.

In the "know your mosquito section", we have a very unusual looking mosquito, scroll down to meet *Toxorhynchites brevipalpis*. One male belonging to this species was found dead in Porirua (see table 2 for more details about this finding).

In the news this month, scientists found that toxins produced by certain cyanobacterium increase the damage produced in the brain by zika virus. On the other hand, new research has found that zika virus may help the immune system to fight tumours. A novel treatment for Malaria is almost ready to move into the first phase of clinical trials and researchers have found that removing a nutrient sensing receptor from mosquitoes causes death at the larval stage. Scroll down for more interesting news.

We hope you enjoy the Easter season, stay healthy and safe in your bubble.

Also we hope you enjoy our Easter egg-mozzie hunting challenge!

SURVEILLANCE

During March 1066 samples were collected by staff from 12 DHBs with 31% of the samples being positive. The samples included 234 positive larval samples and 92 adult samples, leading to a total of 1727 adults and 13406 larvae identified over the past month (Table 1). The dominant larval species this month, this year and last year is *Culex quinquefasciatus*.

Compared to this same month last year, the total number of larvae has shown a decrease

(87%), while the number of adult mosquitoes has shown an 49% increase (Table 1).

In total, eight mosquito species have been collected this month (Table 1), that is one more than last month.

Compared to last month, mosquito larval number have shown a decrease (56%) and adult numbers have shown an increase (180%) (Table 1).

Table 1. Adult and larvae sampled by the New Zealand surveillance program during March 2019 & 2020

Species (common name)	Adults		Larvae	
	Mar 20	Mar 19	Mar 20	Mar 19
Aedes antipodeus (winter mosquito)	1	-	-	-
Ae australis (saltwater mosquito)	-	-	1	-
Ae notoscriptus (striped mosquito)	311	18	1780	3391
Coquillettidia iracunda (no common name)	6	-	-	-
Culex pervigilans (vigilant mosquito)	291	75	1056	1515
Cx quinquefasciatus (southern house mosquito)	1044	730	10530	20135
Culex sp. (missing their abdomens, likely to be *quinquefasciatus* or *pervigilans*)	73	58	-	-
Culiseta tonnoiri (no common name)	1	-	-	-
Opifex fuscus (rock pool mosquito)	-	-	39	20
Total	**1727**	**881**	**13406**	**25061**

The highest number of larvae sampled this month was obtained in Community and Public Health (4602), followed by Northland DHB (2269) (Figure 1).

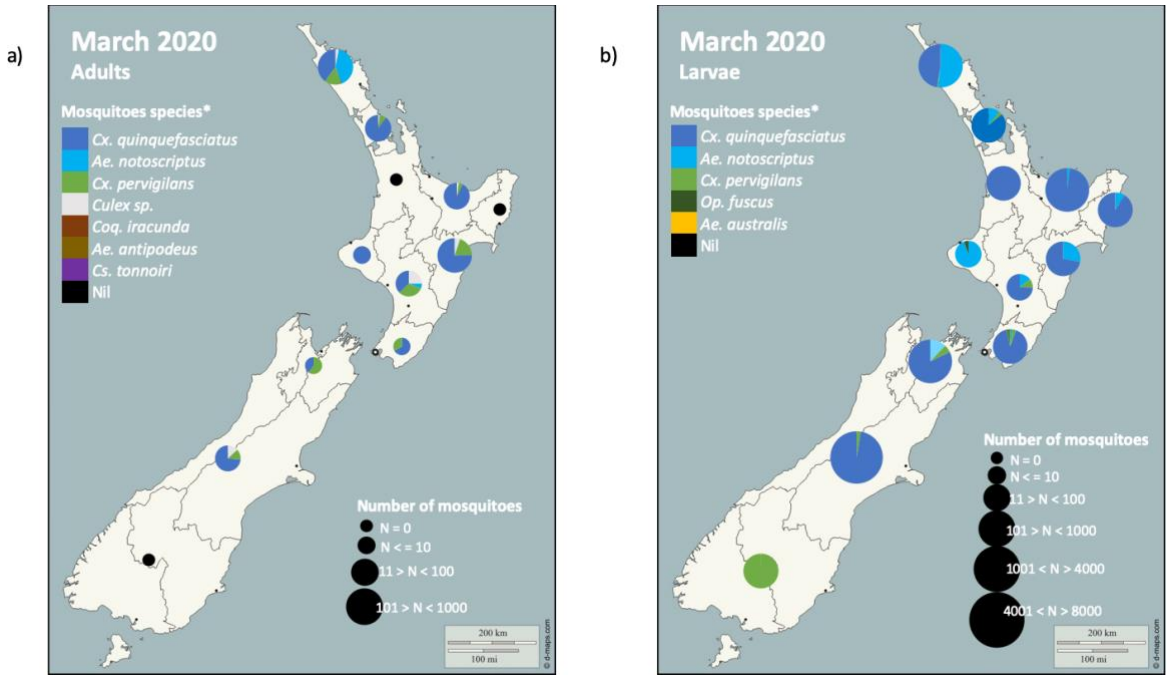


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the March 2020 surveillance period.
* The mosquito species are listed in order from the most abundant to the least abundant.
Please note that the markers represent the DHBs and not the specific sites where the samples have 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 four DHBs from this same month last year and a decrease in six DHBs (Figure 2).

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

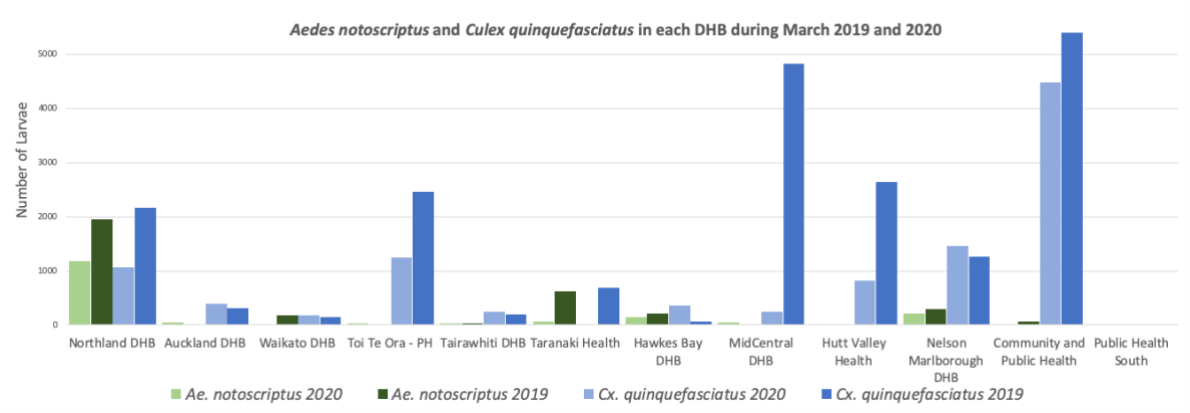


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during March 2019 and 2020.

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

INCURSIONS AND INTERCEPTIONS

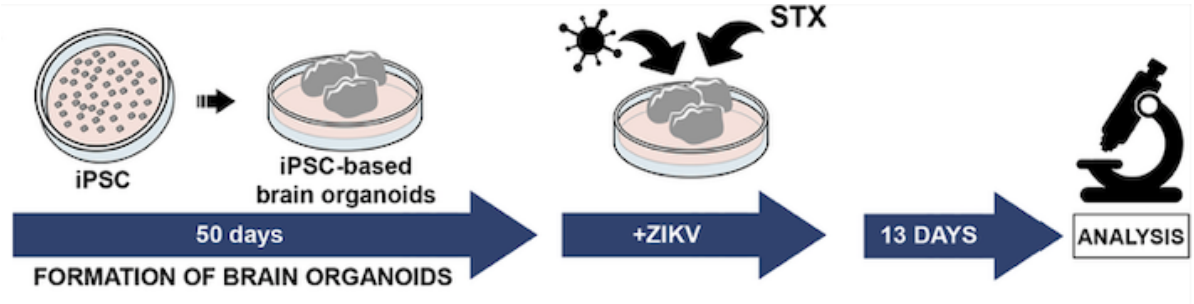
During March seven suspected interception have been recorded (Table 2), including one exotic species of no medical importance (highlighted in blue) and one event involving four individuals of an introduced species in New Zealand from exotic origin (highlighted in yellow).

Table 2. Suspected interceptions during March 2020.

Date	Species	Location	Circumstances
03.03.2020	1 non mosquito 1 Female *Culex pervigilans*	Freshmax ltd TF, Auckland	Found alive in the MPI room while checking grapes from Chile.
04.03.2020	1 non mosquito (Crane fly)	Profreight TF Mangere	Found alive in a container.
11.03.2020	1 Female *Culex quinquefasciatus*	Wellington International Airport	Found alive by MPI Biosecurity officers flying around at International arrivals biosecurity area.
13.03.2020	1 Female *Culex quinquefasciatus*	Auckland International Airport	Found alive by MPI by X-ray unit.
19.03.2020	4 Female *Culex quinquefasciatus*	Auckland International Airport	3 alive and 1 dead mosquitoes found on an aeroplane from Kuala Lumpur, Malaysia.
19.03.2020	1 Male *Toxorhynchites brevipalpis*	Conroy Removals, Porirua	Found dead by MPI in a container of personal items from South Africa.
20.03.2020	1 Female *Culex pervigilans*	Wellington International Airport	Found alive sitting on a windows around the main gate.

NEWS ARTICLES FROM AROUND THE WORLD

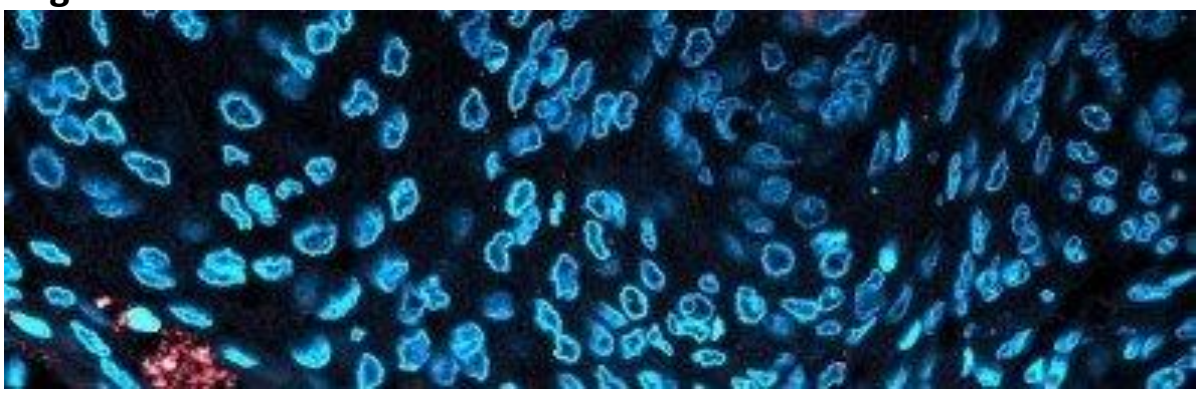
The cyanobacterial saxitoxin exacerbates neural cell death and brain malformations induced by Zika virus



Saxitoxin increases cell death in ZIKV-infected brain organoids.

Cyanobacteria found in drinking water is already a serious public health concern worldwide. North Eastern Brazil had a significantly higher incidence of microcephaly during the outbreak of Zika Virus in 2015-16, and the authors of the study theorised it was due to large amounts of toxin-producing cyanobacterial blooms which occur during drought periods in this area. The researchers used both zika infected human brain organoids and zika infected mice which had been given water containing low levels of the cyanotoxin saxitoxin (STX) to drink during pregnancy. They found that the death of neural cells in the human brain organoids was doubled after exposure STX in those infected with zika, while the mice who ingested STX had an increased instance of zika related brain abnormalities in their new-born mice. Read more.

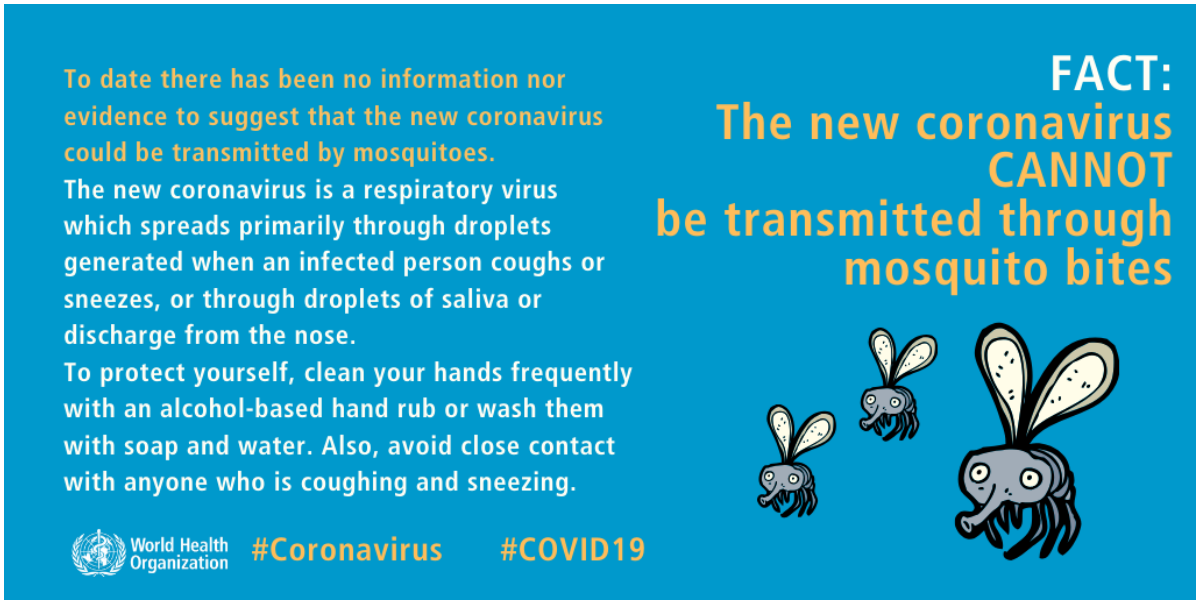
Zika combats advanced-stage central nervous system tumors in dogs



A strain of zika virus from Brazil has been injected into the cerebrospinal fluid of dogs with tumors in their nervous system as a form of treatment that is less aggressive than standard treatments currently available. Without any treatment, the animals would be expected to live for approximately 20-30 days. Of the three dogs tested, two survived for 80 days and 150 days, with a 37.92% and 35.5% reduction in tumor size respectively. The third dog came in unable to stand or eat and was in a pre-coma state. While he only survived 14 days post

treatment and had to be put down due to cardiac issues related to the tumor, he was able to eat again and walk a small amount 3 days after treatment. Analysis of the tumors showed that zika was only present around the edges of the tumor and did not affect the surrounding brain cells. The zika infection allowed T lymphocytes, macrophages, and monocytes into the tumor, a response that is often blocked by the blood-brain barrier. Read more.

The new coronavirus CANNOT be transmitted through mosquito bites.



World Health Organization. Coronavirus disease (COVID-19) advice for the public: Myth busters

Mosquitoes and ticks can't spread all types of viruses. At this time, we have no data to suggest that COVID-19 or other similar coronaviruses (e.g. SARS, MERS) are spread by mosquitoes or ticks. For a virus to pass to a person through a mosquito or tick bite, the virus must be able to replicate inside the mosquito or tick. For more facts related to COVID-19 click here.

Novel compounds show promise as potent new treatment for malaria

A novel treatment for Malaria has been developed by researchers from Australia and the USA, which has shown to be effective in preclinical testing against different species of

malaria parasites and multiple stages of the parasites lifecycle. The compound WM382 killed the malaria parasites in the liver, as well as prevented the parasites found in the blood being transmitted to mosquitos, preventing it from being passed on. WM382 works by targeting two crucial enzymes in the malaria parasite and works on malarial parasites which are resistant to the effects of current antimalarial drugs. The researchers are hoping to move onto the first phase of clinical trials soon. Read more.

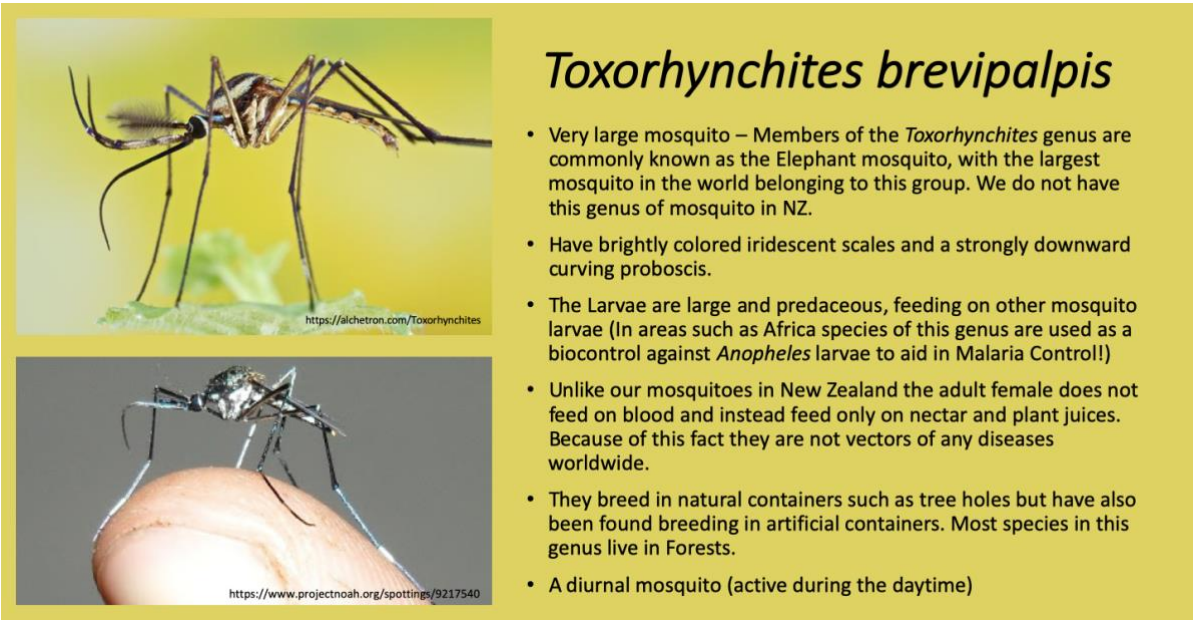
Mosquito Control Continues to Protect Public Health During Coronavirus Outbreak

The current lockdowns in place meant to curtail spread of coronavirus will not preclude the performance of essential mosquito control activities in the United States. Despite emphasis on testing and treating COVID-19 patients, we can't lose sight of the fact that other debilitating and potentially fatal diseases transmitted by mosquitoes may also potentially infect our citizens. Read more.

River Murray Mosquito Warning

South Australians are being warned to avoid exposure to mosquitoes, following positive tests to the potentially deadly Murray Valley Encephalitis Virus and Kunjin virus during routine monitoring. South Australia Health's Director of Health Protection, Michaela Hobby, said several sentinel chickens, which are part of a surveillance flock based at Ramco near Waikerie, tested positive to both Murray Valley Encephalitis Virus (MVEv) and Kunjin virus. Read more.

KNOW YOUR MOSQUITO



THE EASTER EGG MOZZIE HUNTING

There are three female mosquitos from three different genera: *Anopheles*, *Culex* and *Aedes*. Join the female mosquito with its eggs and their favourites oviposition habitats (it could be more than one oviposition habitat).

Answers will be available in the April Newsletter.

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).

Disease Outbreak News - 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