NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER – DECEMBER 2019

WELCOME!

Kia Ora Koutou,

Hope you all had a very Happy Christmas and a great and relaxing holiday break. This month we have produced the annual mozzie chart for you to find out which was the mozziest month of 2019. Also scroll down to learn about *Coquillettidia iracunda* a handsome and interesting New Zealand mosquito species which has a very special siphon.

In the news this month, read about the increase of dengue cases around the world and how researchers have developed a new model to predict the spread of dengue fever to non-endemic countries. Afghanistan is facing a dengue outbreak showing endemic cases for the first time and researchers have made significant advances in developing a Zika virus vaccine.

SURVEILLANCE

During December 1253 samples were collected by staff from 12 DHBs with 14% of the samples being positive, that is 29% more positive samples than last month. The samples included 138 positive larval samples and 39 adult samples, leading to a total of 365 adults and 7559 larvae identified over the past month (Table 1). The dominant larval species this month is *Aedes notoscriptus*, while this month last year was *Culex pervigilans.*

Compared to this same month last year, the total number of larvae and adult mosquitoes have shown an increase (58% and 7% respectively) (Table 1).

In total, seven mosquito species have been collected this month (Table 1), that is two less

than last month. Northland DHB detected the highest number of mosquito species, which was four (Figure 1).

Compared to last month, mosquito larvae have shown an increase (167%), and adults have shown a decrease (31%) (Table 1).

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

Species (common name)	Adults		Larvae	
	Dec 19	Dec 18	Dec 19	Dec 18
Aedes antipodeus (winter mosquito)	17	1	-	-
Ae australis (saltwater mosquito)	-	-	-	3
Ae notoscriptus (striped mosquito)	147	50	3142	1057
Ae subalbirostris (no common name)	-	-	2	-
Coquillettidia iracunda (no common name)	11	32	-	-
Culex pervigilans (vigilant mosquito)	52	64	2264	1376
Cx quinquefasciatus (southern house mosquito)	137	169	2072	544
Culex sp. (missing their abdomens, likely to be *quinquefasciatus* or *pervigilans*)	1	24	-	-
Opifex fuscus (rock pool mosquito)			79	209
Total	**365**	**340**	**7559**	**3189**

The highest number of larvae sampled this month was in Northland DHB (4036), followed by Toi Te Ora - PH (1257) (Figure 1).

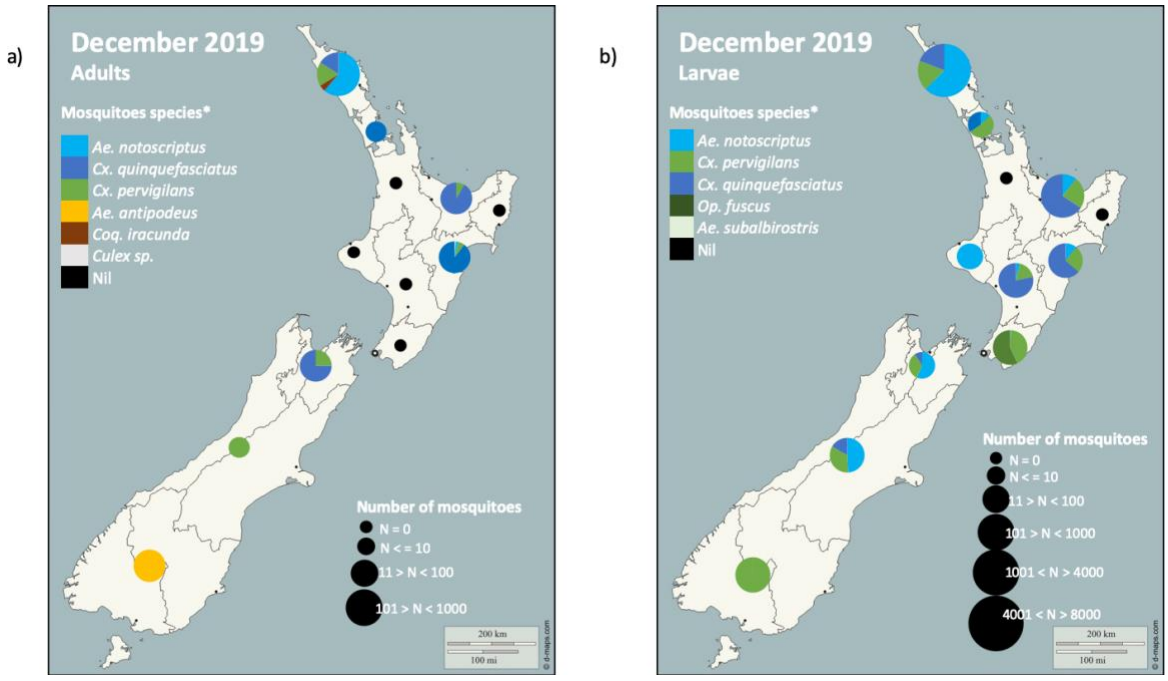


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the December 2019 surveillance period.
* The mosquito species are listed in order from the most abundant to the least abundant.
Please note that the markers represent the DHBs and not the specific sites where the samples 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 four DHBs from this same month last year and a decrease in five DHBs and is absent in Waikato DHB (Figure 2) this year.

Culex quinquefasciatus larval numbers have shown an increase in Northland DHB and Toi Te Ora - PH from this same month last year and were collected this year in Community and Public Health, Hawkes Bay, Nelson Marlborough and MidCentral DHB (Figure 2).

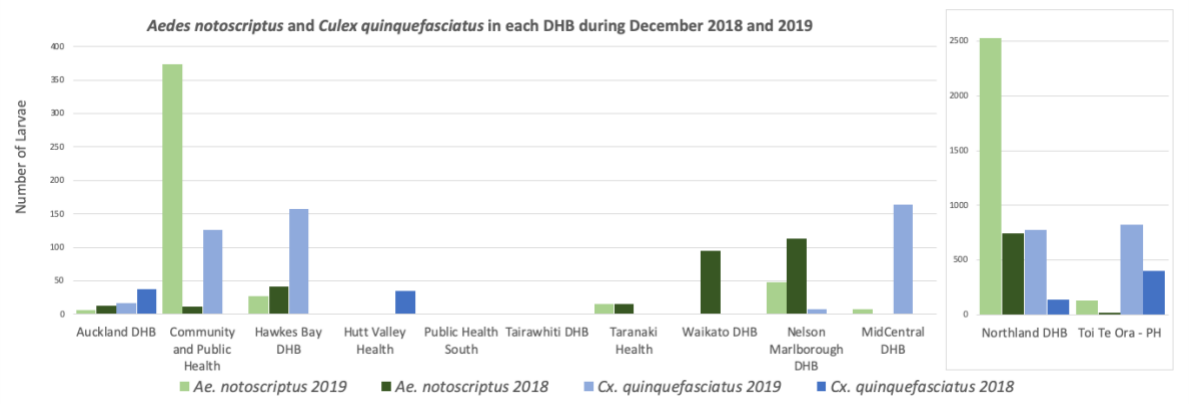


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during December 2018 and 2019.
*Please note the different scale for the number of larvae present in Northland in comparison to the other DHBs.

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

MOZZIE NUMBERS FOR THE YEAR

During 2019, a total of 101,765 larvae (Figure 3) and 11,589 adults (Figure 4) were identified in the NZBioSecure Entomology Laboratory, that is 21% more larvae and 20% less adults than last year.

A total of 12 species of mosquitoes were detected this year (that is 4 more than last year) with *Culex quinquefasciatus* the best represented with 59% of the larvae and 73% of the adults, followed by *Aedes notoscriptus* with 24% of the larvae and 17% of the adults. The least represented mosquitoes were the endemic *Culiseta tonnoiri* (1 adult) and *Coquillettidia tenuipalpis* (2 adults) and the introduced *Aedes australis* (1 larvae).

The highest number of mosquitoes collected (larvae plus adults) this year was in February (28,489) followed by March (25,884) while last year was February (29,004) followed January (22,935). This year the highest number of species was recorded in January and November (9

species) and the least number was recorded in March, June, August and September (4 species).

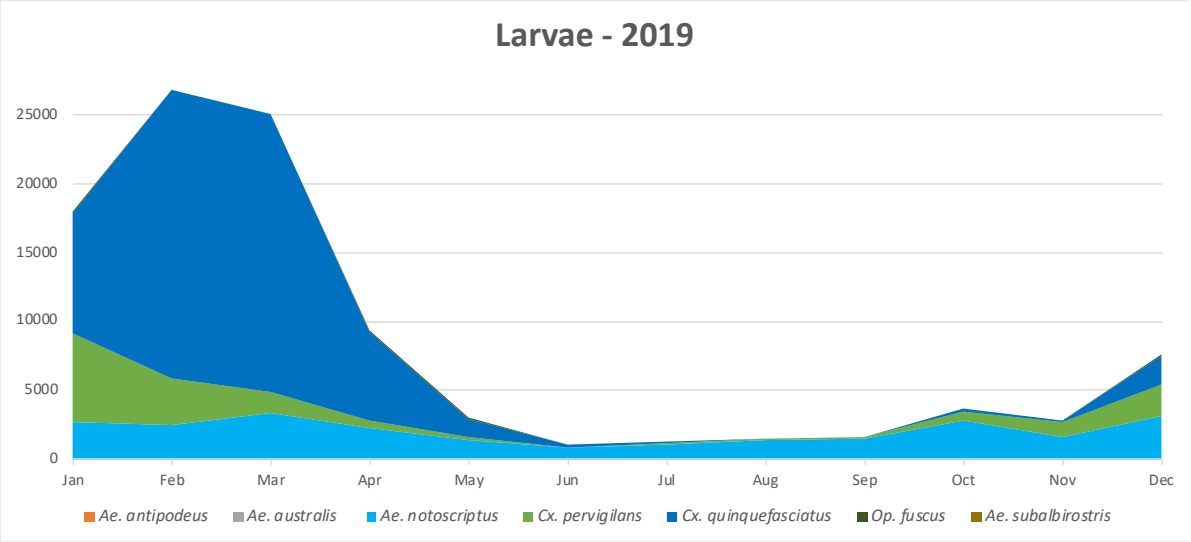


Figure 3. Variation in total mosquito larvae numbers thought 2019.

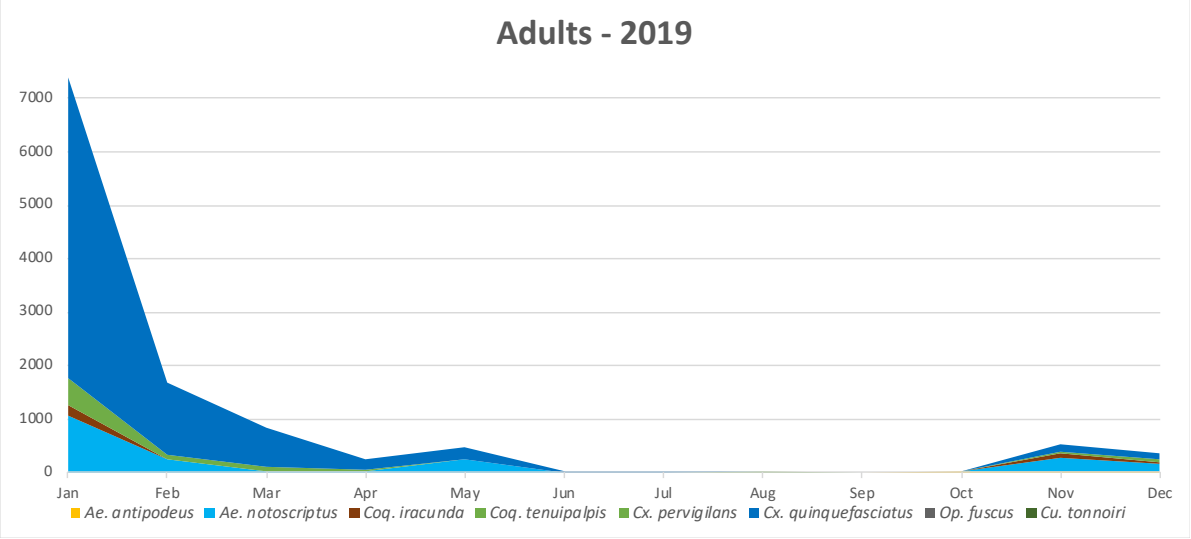


Figure 4. Variation in total mosquito adult numbers thought 2019.

INCURSIONS AND INTERCEPTIONS

During December two suspected interception have been recorded. (Table 2).

Table 2. Suspected interception during December 2019

Date	Species	Location	Circumstances
09.12.2019	1 Female *Culex quinquefasciatus* 1 Male *Culex quinquefasciatus*	Freshmax, Mt Wellington, Auckland	Found alive in MPI inspection room while checking a shipment of bananas.

Date	Species	Location	Circumstances
19.12.2019	1 Female *Culex pervigilans*	Christchurch International Airport	Found alive in baggage area

NEWS ARTICLES FROM AROUND THE WORLD

A global model for predicting the arrival of imported dengue infections

Researches have created a new model to predict how dengue may spread through air travel, particularly to non-endemic countries, with more accuracy than current models. They used data from the World Health Organisation and airports to look at if visitors to countries, or residents returning home are more likely to introduce dengue to a country, as well as when incidents of dengue coming from endemic areas are likely to peak, and which countries are most likely to be effected. Read more. *Original publication*.

Dramatic increase of dengue cases worldwide

There has been a substantial worldwide increase in dengue cases to date in 2019 compared with the same time period in 2018. This means that travellers who are planning a trip to risk areas have a much higher risk of becoming infected with dengue now than they had last year. Countries with most cases: Brazil, the Philippines, Mexico, Nicaragua, Thailand, Malaysia and Colombia. The majority (85 %) of the 1,049,000 cases reported during the last three months occurred in these countries. Amongst these are popular destinations for British travellers, such as Mexico and Thailand. Read more.

Dengue fever – Afghanistan: Disease outbreak news, 13 December 2019

Afghanistan has detected their first cases of local transmitted dengue. Out of 14 confirmed cases of Dengue, seven of these were likely acquired locally as the patients had no travel history to dengue endemic countries. Read more.

Zika's Undetected Long-Term Impact on Children

A new study suggests the need for long-term neurodevelopmental monitoring for all infants with Zika virus exposure to ascertain the impact of the virus as the infected child ages. In this study published in *JAMA* on January 6, 2020, infants exposed to Zika virus in the womb showed neurodevelopmental delays as toddlers, despite having "normal" brain imaging and head circumference at birth. Read more.

Researchers make significant advances in developing novel Zika virus vaccine

Researchers from the University of Adelaide have made significant advances in developing a novel vaccine against Zika virus, which could potentially lead to global elimination of the disease. Read more. Access the original article.

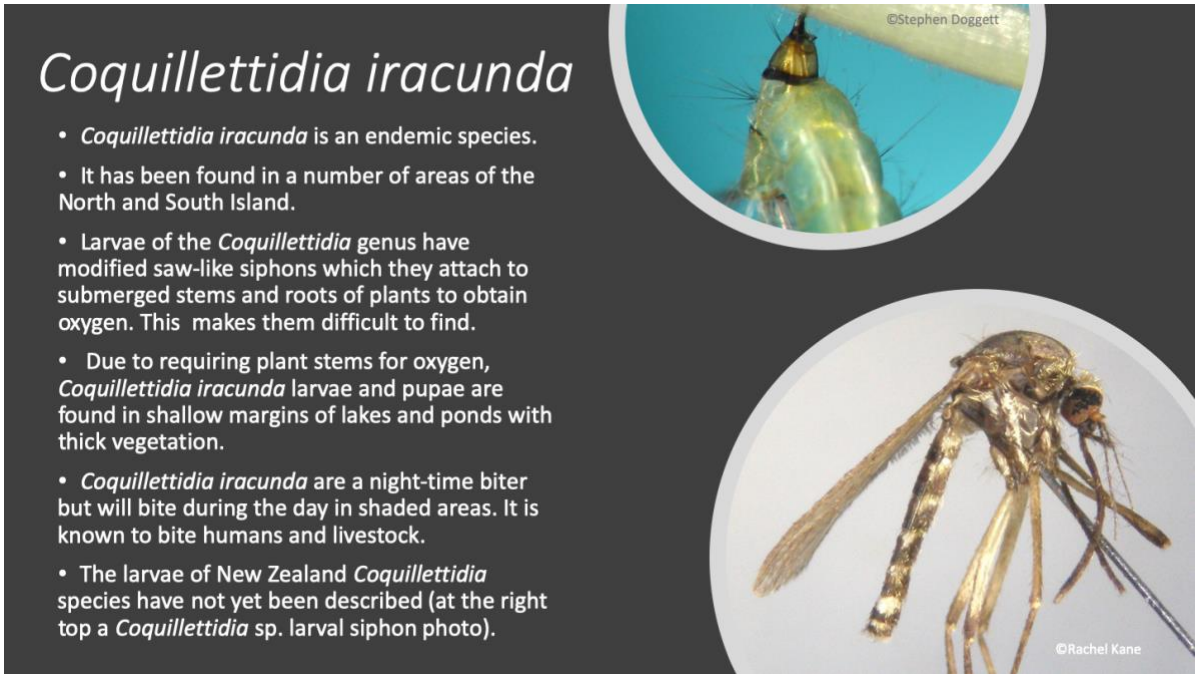
New study reveals the origin of complex malaria infections

New technology employing single cell genome sequencing of the parasite that causes malaria has yielded some surprising results and helps pave the way for possible new intervention strategies for this deadly infectious disease. Read more.

Researchers identify that mosquitoes can sense toxins through their legs

Researchers at the Liverpool School of Tropical Medicine have discovered a new mechanism in insecticide resistance in *Anopheles gambiae* and *Anopheles coluzzii*, two of the major vectors of malaria. They found that a particular family of binding proteins were expressed at a higher level in populations that were resistant to insecticides, particularly pyrethroids which are commonly used on bed nets. They found that mortality of *Anopheles* significantly decrease when these binding proteins were over-expressed in a situation where mortality would usually occur, while when these proteins were made inactive, mortality rates increased again. Read more.

KNOW YOUR MOSQUITO



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