



BORDER HEALTH NEWSLETTER – FEBRUARY 2020

WELCOME!

Kia Ora Koutou,

This month, in the “know your mosquito section”, we have a unique rock-pool mosquito from New Zealand. Interestingly, the male adults are equipped with very long claws which are used to hold the emerging females during mating. Any ideas about which mosquito we are highlighting? Scroll down, and you will find out!

Also this month we would like to congratulate Laura Bruce for her great set of mozzie pictures sent to the lab during a suspected interception in Christchurch International Airport. Please scroll down and have a look at a small selection of her great mozzie pictures.

In the news this month, scientists are testing the effectiveness and safety of an antibody against malaria. New research has found that rather than the insects flying towards the heat source, as previously thought, they actually fly away from the cold. A new, eco-friendly method of controlling mosquito larvae using yeast and essential oils is being developed and finally, in the Gold Coast, the council are supplying fish to predate on mosquito larvae as a means of control.

SURVEILLANCE

During February 1137 samples were collected by staff from 12 DHBs with 36% of the samples being positive, that is 230% more positive samples than last month. The samples included 331 positive larval samples and 82 adult samples, leading to a total of 616 adults and 30843 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 an increase (13%), while the number of adult mosquitoes has shown a decrease (190%) (Table 1). The difference in adult mosquito numbers is highly influenced by the difference in adult samples taken in Northland. In February this year only 1 sample was obtained, in contrast with the 14 obtained this same month last year.

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

Compared to last month, mosquito larvae and adult numbers have shown an increase (84% and 5% respectively) (Table 1).

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

Species (common name)	Adults		Larvae	
	Feb 20	Feb 19	Feb 20	Feb 19
<i>Aedes antipodeus</i> (winter mosquito)	2	12	24	-
<i>Ae australis</i> (saltwater mosquito)	-	-	1	4
<i>Ae notoscriptus</i> (striped mosquito)	7	79	5790	2807
<i>Ae subalbirostris</i> (no common name)	-	-	11	-
<i>Coquillettia iracunda</i> (no common name)	-	3	-	-
<i>Culex asteliae</i> (no common name)	-	1	-	-
<i>Culex pervigilans</i> (vigilant mosquito)	57	35	2604	3157
<i>Cx quinquefasciatus</i> (southern house mosquito)	520	444	22382	10596
<i>Culex</i> sp. (missing their abdomens, likely to be <i>quinquefasciatus</i> or <i>pervigilans</i>)	30	14	1	-
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	30	146
Total	616	588	30843	16710

The highest number of larvae sampled this month was obtained in Community and Public Health (10377), followed by Northland DHB (6396) (Figure 1).

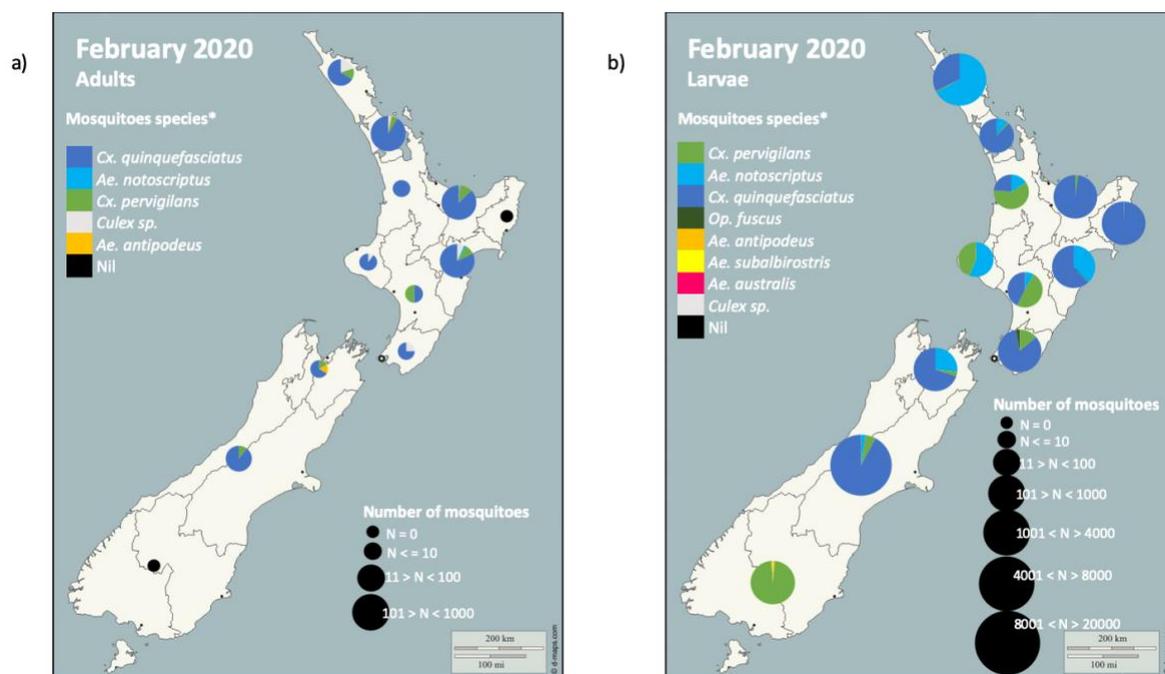


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the February 2020 surveillance period.

* 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 five DHBs from this same month last year and a decrease in three DHBs and were not recorded in Hutt Valley and Tairawhiti where it was absent last year this same month (Figure 2).

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

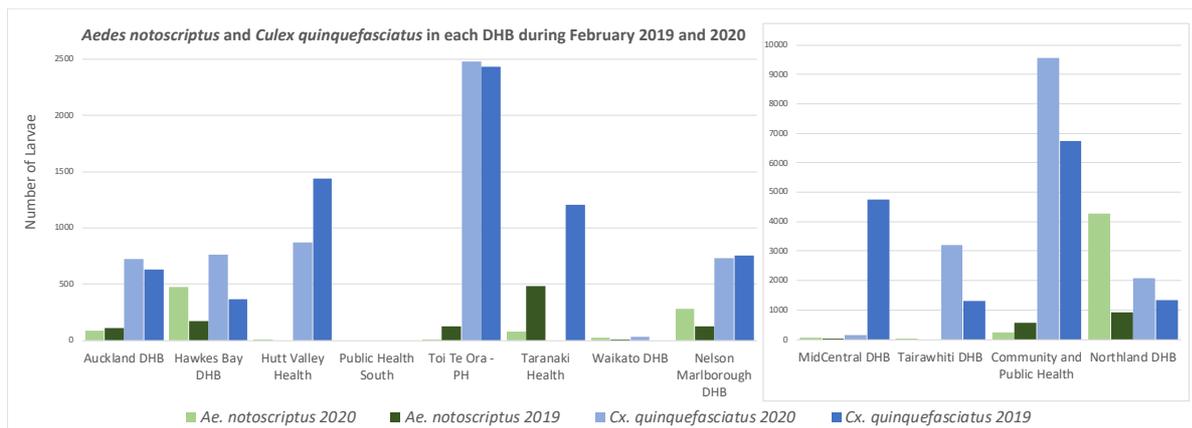


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during February 2019 and 2020.

*Please note the different scale for the number of larvae present in MidCentral DHB, Tairawhiti DHB, Community and Public Health, and Northland DHB in comparison to the other DHBs.

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

INCURSIONS AND INTERCEPTIONS

During February six suspected interception have been recorded (Table 2).

Table 2. Suspected interceptions during February 2020.

Date	Species	Location	Circumstances
05.02.2020	1 Female likely <i>Culex</i> sp.	MPI Inspection Room - Menzies Aviation	Mosquito found alive while unwrapping a pallet of woven mats from Samoa. The identification is based on a photo since the sample did not arrive at the lab.
05.02.2020	1 Female <i>Culex quinquefasciatus</i>	AIAL - ITB - MPI Lab	Found alive by MPI after returning to the MPI Lab from inspecting the NZers returning for Wuhan Province in China
11.02.2020	1 Female <i>Culex quinquefasciatus</i>	Christchurch Airport	Found alive by MPI in the arrivals operational room.
14.02.2020	1 Adult Chironomidae 1 Larva Chironomidae	Nelson Port	Larva found alive in water pooled on tarp on top of container, Dead adult found in water.
17.02.2020	1 Male <i>Culex quinquefasciatus</i>	EIF international TF, Wiri, Auckland	Found dead in a container of frozen goods from Tonga.
24.02.2020	1 Adult Crane fly	Arrivals area of the International Terminal Building of AIAL.	Detected alive around the search bench by MPI Officer while inspecting a box of coconuts from the Cook Islands.



NEWS ARTICLES FROM AROUND THE WORLD

First Human Trial of Monoclonal Antibody to Prevent Malaria Opens



NIAID Research Nurse Jennifer Cunningham, B.S.N., looks on as a healthy volunteer receives an infusion of CIS43LS, an experimental monoclonal antibody against malaria, as part of a Phase 1 clinical trial. Credit: NIAID

The first phase of a clinical trial which aims to test the effectiveness and safety of a monoclonal antibody (mAb) against malaria has begun enrolling volunteers. The volunteers are 18-50 years old who have not been exposed to malaria previously. They will be given the antibody and some will be exposed to mosquitoes carrying a specific type of malaria which is readily curable using two standard antimalarial medications. The aim is to determine the level of protection from malaria infection, and dosage that will be most effective. [Read more.](#)

Mosquito-eating fish deployed on Gold Coast amid 'plague' caused by record rain



Crimson-spotted rainbow fish feed on mosquito larvae, before they become adult mosquitoes. (Image from: Queensland Government)

The Gold Coast in Australia has had record breaking levels of rain, which has created ideal breeding conditions for mosquitoes and mosquito numbers have increased dramatically. The council have been employing control methods including fogging, larvicides and removing breeding sites. In the breeding sites that cannot be removed, the council are also supplying residents with fish, which predate on the larvae. [Read more.](#)



Eco-friendly way to stop mosquitoes

Researchers at the University of New Mexico have been working on an eco-friendly method of killing mosquito larvae. Various essential oils derived from plants have been shown to have insecticidal properties, including orange oil. Unfortunately, many essential oils will break down when they are exposed to sunlight. Simple bakers' yeast is a favourite food for mosquito larvae and is commonly used as a large portion of the diet when growing them in the lab. The researchers found that they were able to combine the orange oil and yeast to work as a delivery system for the orange oil. The oil renders the yeast inactive, while retaining the outer casing which protects the oil from dispersing in the environment and from sunlight and limits the effect on non-target species. Once the yeast is eaten by the larvae, the orange oil is released into the gut of the larvae and kills it. [Read more. Read the original article.](#)

How mosquitoes find humans to bite



Anopheles gambiae mosquito. Credit: Willem Laursen, Garrity lab

Research into what attracts mosquitos to humans (and other animals) continues with a new insight into the role that temperature plays in the attraction. Mosquitos, like other fly relatives, sense temperature using temperature-sensing receptors that are located on the tips of the antenna. In the current study from Garrity Lab at Harvard T.H. Chan School of Public Health found that rather than the insects flying towards the heat source, as previously thought, they actually fly away from the cold. The discovery holds out the possibility of one day being able to fool or knock-out the insects' temperature sensors so they don't spread disease. To find out more about this study and watch the videos of the responses [check out here. Read more. Read original article.](#)

THE BEST INTERCEPTION MOZZIE PICTURE OF THE MONTH

About the photographer: Laura Bruce is a Health Protection Officer working for the Community and Public Health, Canterbury District Health Board

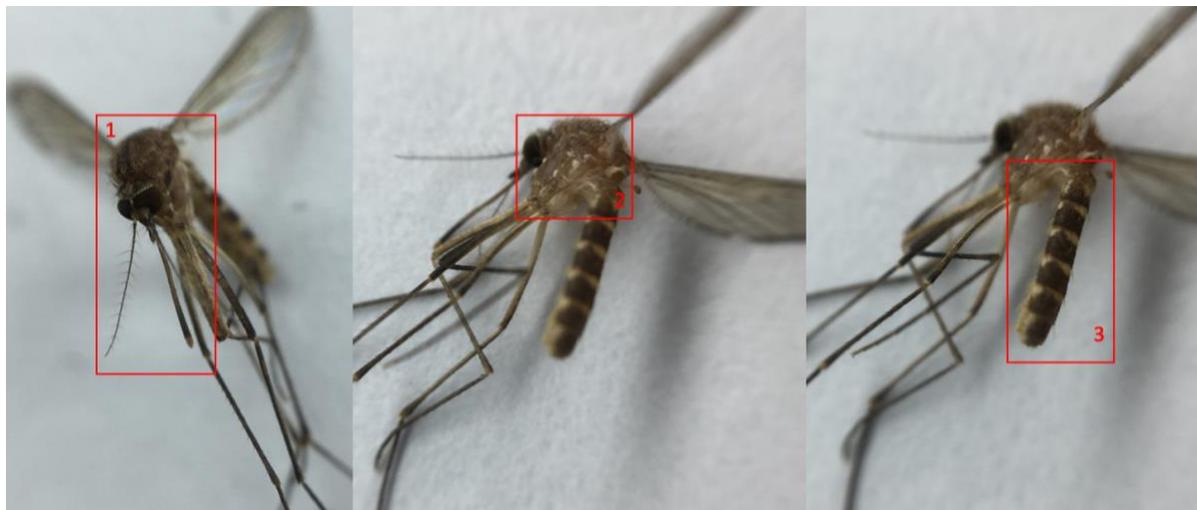
About the pictures: In a suspected interception situation the lab received a number of pictures focussing on different parts of the mosquito body, which provided a lot of useful information to the On-call Entomologist. 1. The



proboscis, antenna and palps were clearly visible. 2. The marks on the thorax indicate that this mosquito is a *Culex (Culex)* sp. 3. The shape of the end of the abdomen indicates that the mosquito is a female and pattern on the abdomen suggests a *Culex* sp.

Characteristics of a good set of Mozzie pictures:

- The different pictures are taken with the mosquito in different positions.
- The focus is in different areas of the mosquito body.
- The picture allows the viewer to see the different colours and patterns.
- All body parts are distinguishable.



Female *Culex quinquefasciatus*

KNOW YOUR MOSQUITO

Opifex fuscus Rock pool mosquito

- An endemic species to NZ and the only native rock pool mosquito found in mainland NZ.
- Found in coastal areas around many parts of both the North and South island as well as many offshore islands.
- They breed in brackish/saline pools above the high tide line and have also been found breeding in artificial containers close to the sea.
- *Opifex fuscus* have unusual mating habits. The male emerges noticeably sooner than female and waits on the surface of the water, using their long claws they grab a pupa as it moves to the surface and mate with the emerging adult.
- The female is able to lay their first batch of eggs autogenously (without a blood meal).
- They regularly bite humans, have a painful bite and will bite during day and night. They have no known or suspected vector status.





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
