



BORDER HEALTH NEWSLETTER – DECEMBER 2018

WELCOME!

Kia Ora Koutou

It was a very good year full of learning, great experiences and many mosquitoes. Which month do you think was the mozziest? Scroll down and find the mozzie numbers for 2018.

In the news this month, researchers from Hawaii medical school have successfully developed a vaccine candidate for the Zika virus. In West Africa, scientists are deploying balloons to sample mosquitoes which allow the researchers to figure out how high mosquitoes can fly and more.

In the section “Know your mosquito” learn about Fungus Gnats a “non-mosquito” often mistaken for one and in the section “A bite of humour” have fun with Gary Clark’s cartoons.



SURVEILLANCE

During December 1184 samples were collected by staff from 12 DHBs, with 168 positive samples. This included 58 adult samples and 110 larval samples, leading to a total of 340 adults and 3189 larvae identified over the past month (Table 1). The dominant larval species this month and this month last year was *Culex pervigilans*.

Compared to this same month last year the total number of adults and larvae have shown a decrease (201% and 183% respectively; Table 1).

In total seven mosquito species have been collected this month (Table 1), that is one less than the same month last year, and the same number as last month this year. Auckland and Hawkes Bay detected the highest number of mosquito species (5) per DHB this month (Figure 1).

Table 1. Adult and larvae sampled by the New Zealand surveillance program during December of last year and this year.

Species (common name)	Adults		Larvae	
	Dec 18	Dec 17	Dec 18	Dec 17
<i>Aedes notoscriptus</i> (striped mosquito)	50	226	1057	2557
<i>Ae. antipodeus</i> (winter mosquito)	1	3	-	-
<i>Ae. australis</i> (saltwater mosquito)	-	-	3	-
<i>Ae. subalbirostris</i> (no common name)	-	-	-	1
<i>Culex pervigilans</i> (vigilant mosquito)	64	179	1376	4735
<i>Cx. quinquefasciatus</i> (southern house mosquito)	169	588	544	1668
<i>Culex</i> sp. (missing their abdomens, likely to be <i>quinquefasciatus</i> or <i>pervigilans</i>)	24	104	-	-
<i>Coquillettidia iracunda</i>	32	24	-	-
<i>Coquillettidia tenuipalpis</i>	-	4	-	-
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	209	49
Total	340	1128	3189	9010

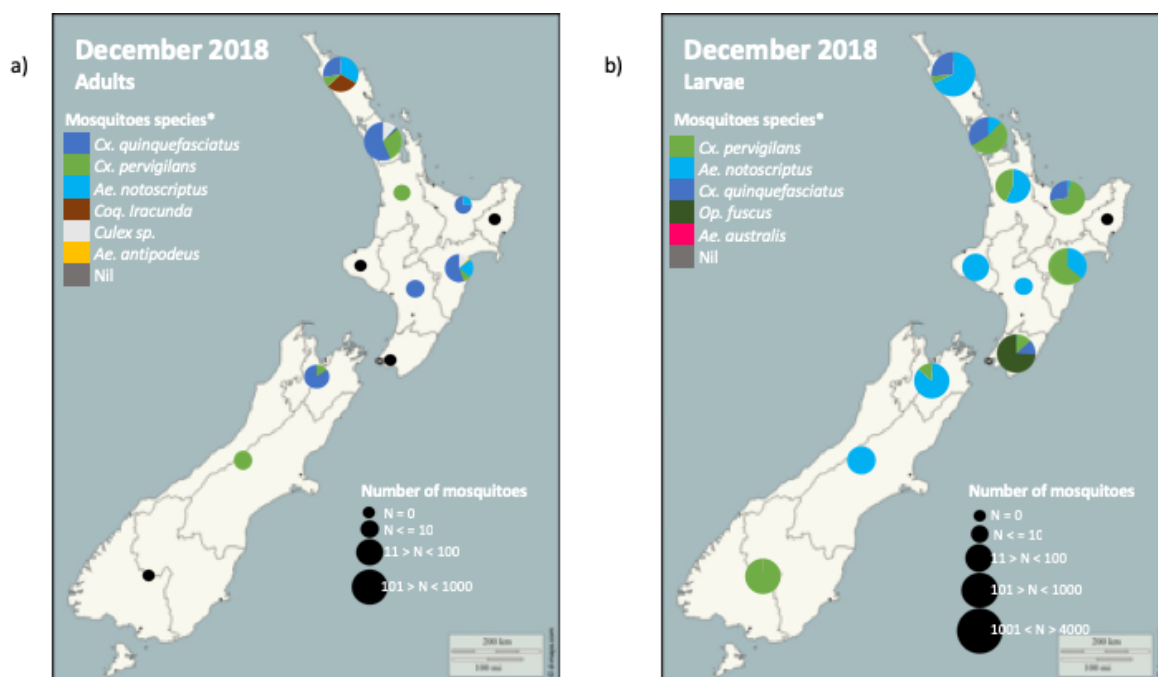


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the December 2018 surveillance period.

* 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, Northland DHB had the highest number of larvae this month (1089, 16% less than last month) followed by Toi Te Ora - PH (654, that is 821% more than last month, Figure 1). Also 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 a decrease in nine DHBs from this same

month last year and it is present now in MidCentral DHB and has not been recorded in Tairawhiti this year (Figure 2).

Culex quinquefasciatus larval numbers have shown a decrease in two DHBs and has not been recorded in four DHBs this year (Figure 2). Nil *Cx. quinquefasciatus* have been registered in three DHBs this month or this same month last year (Figure 2).

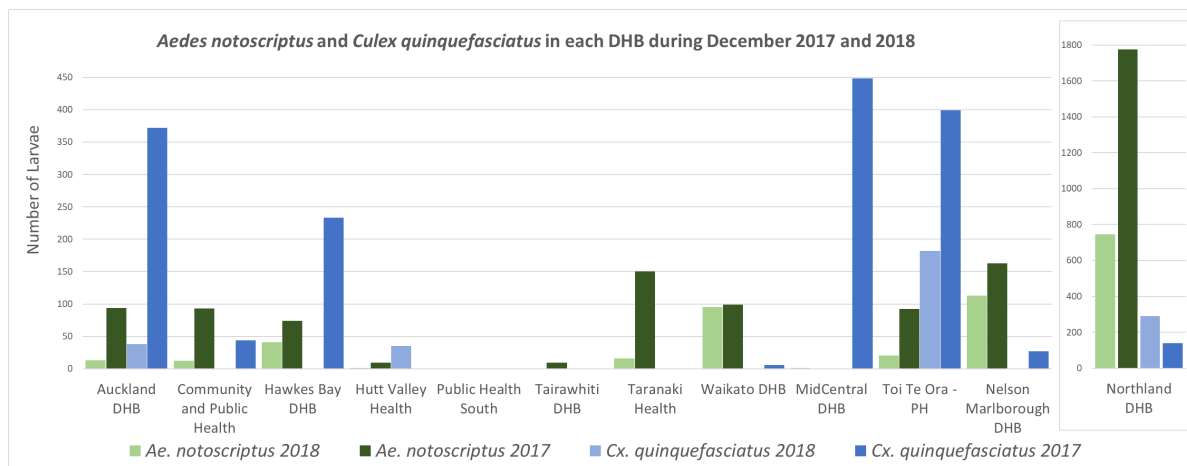


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during December 2017 and 2018. *Please note the different scale for the number of larvae present in Northland in comparison to the other DHBs.

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

MOZZIE NUMBERS FOR THE YEAR

During 2018, a total of 84,107 larvae (Figure 3) and 14,506 adults (Figure 4) were identified in the NZBioSecure Entomology Laboratory (that is 2.3% and 69% respectively more than last year).

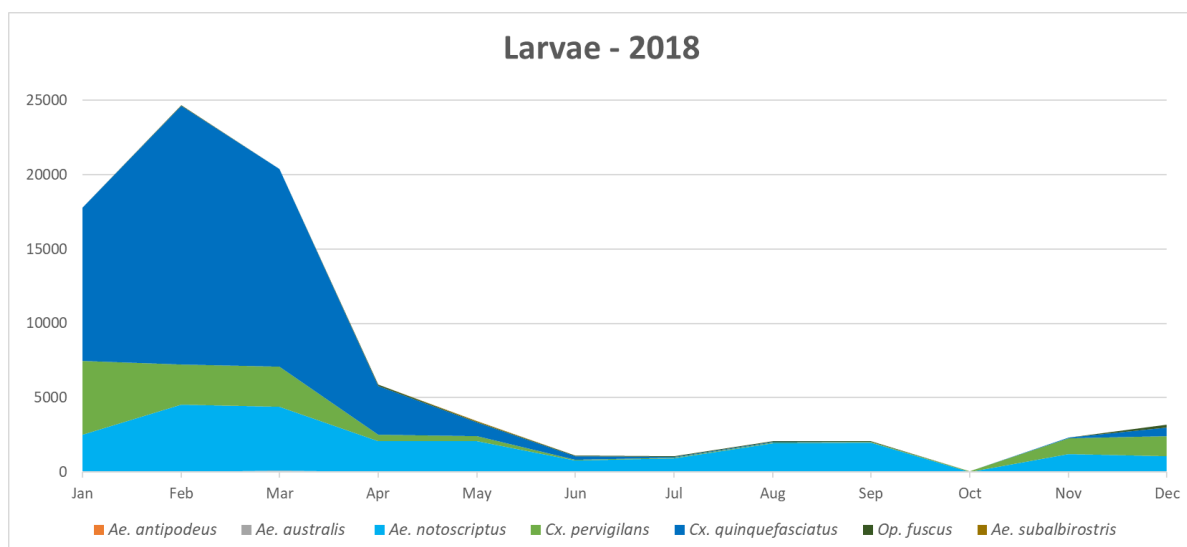


Figure 3. Variation in mosquito larvae numbers through 2018.

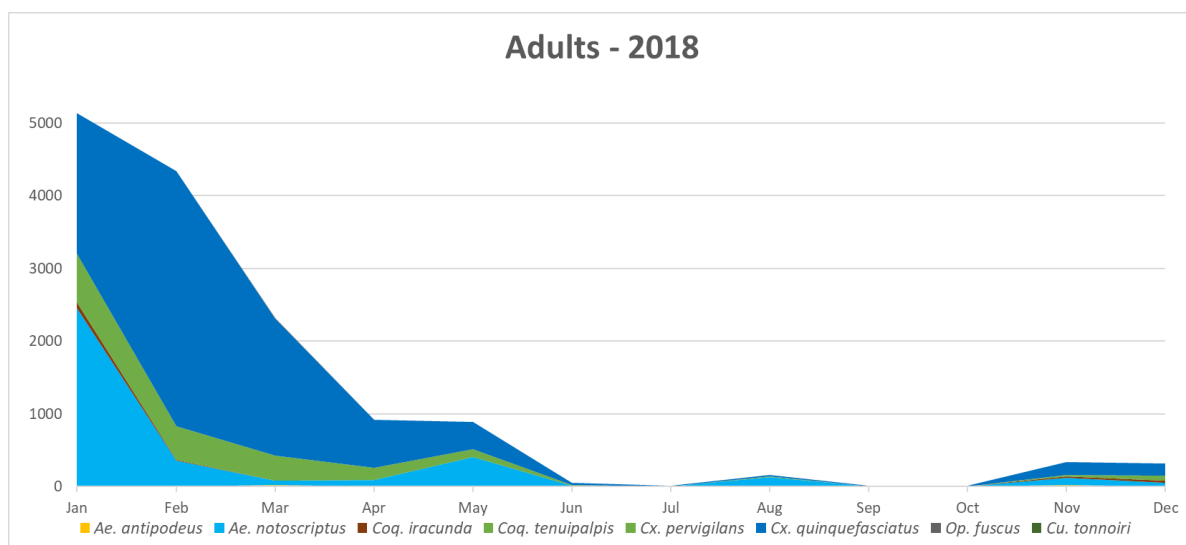


Figure 4. Variation in mosquito adult numbers thought 2018.

A total of 8 species of mosquitoes were detected this year (that is 3 less than last year) with *Culex quinquefasciatus* the best represented with 55% of the larvae and 60% of the adults, followed by *Aedes notoscriptus* with 28% of the larvae and 25% of the adults. The least represented mosquitoes were *Coquillettia tenuipalpis* (2 individuals) and *Culiseta tonnoiri* (7 individuals).

The highest number of mosquitoes (larvae plus adults) was registered in February (29,004) while last year was registered in March (24,046), followed by January (22,935). This year the highest number of species was recorded in January (9) and the least in October (3).

INCURSIONS AND INTERCEPTIONS

During December, five suspected interceptions have been recorded (Table 2). Local species of exotic origin are highlighted in light green.

Table 2. Suspected interceptions during December 2018

Date	Species	Location	Circumstances
17.12.2018	1 Male <i>Culex quinquefasciatus</i>	MG Marketing, Mt Wellington Auckland	Found alive by MPI while devanning a container of Mangoes from Ecuador.
13.12.2018	1 Male <i>Culex quinquefasciatus</i>	Freshmax NZ limited, Mt Wellington Auckland	Found alive by MPI in inspection room while checking boxes of oranges.
11.12.2018	1 Male <i>Culex quinquefasciatus</i>	Freshmax NZ limited, Mt Wellington Auckland	Found dead by MPI in inspection room in a box of Mangoes from Australia.
07.12.2018	1 Male <i>Culex quinquefasciatus</i>	Hutt Valley Hospital	Found dead by Hospital staff in a package of sterilized medical equipment from China.
06.12.2018	1 Window Gnat	NZ Vanlines, Tauranga	Found dead by MPI while devanning.



NEWS ARTICLES FROM AROUND THE WORLD

NEA destroys 100 mosquito breeding habitats at Bedok dengue cluster



SINGAPORE - The authorities have found and destroyed 100 mosquito breeding habitats in the Bedok area – the largest among 17 active dengue clusters discovered here. The Bedok area accounted for 42 of the 110 dengue cases reported across Singapore in the week that ended last Saturday – the first time this year that dengue cases have crossed the century mark in a week. [Read more.](#)

Humans wiped out mosquitoes (in one small lab test)



For the first time, humans have built a set of pushy, destructive genes that infiltrated small populations of mosquitoes and drove them to extinction. For the lab-based annihilation, medical geneticist Andrea Crisanti and colleagues at Imperial College London focused on one of the main malaria-spreading mosquitoes, *Anopheles gambiae*. The mosquitoes thrive in much of sub-Saharan Africa, where more than 400,000 people a year die from malaria, about 90 percent of the global total of malaria deaths. [Read more.](#)

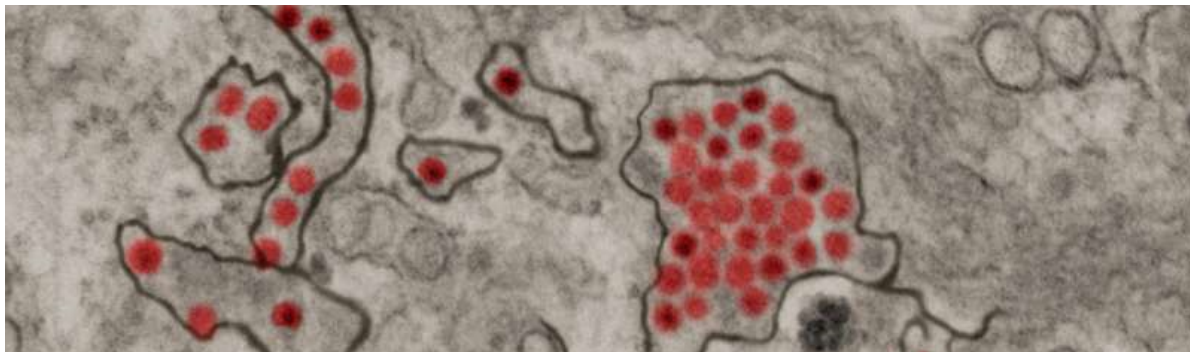
Researchers uncover a number of previously unknown insecticide resistance mechanisms

Researchers at LSTM have used a bioinformatics approach to integrate information from multiple studies on insecticide resistance in mosquitoes and uncovered a number of important resistance mechanisms that had not previously been recognized. [Read more.](#) [Original article.](#)

Killing the liver-stage malaria parasite with baculovirus: a drug discovery approach

Currently, few antimalarial treatments exist that effectively kill liver-stage malaria parasite *Plasmodium vivax*, which can lay dormant for months or even years. Researchers at Kanazawa University have reported a new drug that could eliminate liver-stage malaria parasites completely. Using an insect virus, known as a baculovirus, the researchers investigated the ability of baculovirus to mediate innate immunity against malaria infection. This work could pave the way for developing new and more effective antimalarial treatments. [Read more.](#)

New Zika vaccine effective in preclinical trials



Zika virus particles (red) shown in African green monkey kidney cells. Credit: NIAID

Researchers at the University of Hawaii medical school have successfully developed a vaccine candidate for the Zika virus, showing that it is effective in protecting both mice and monkeys from the infection. Demonstrating the effectiveness of their vaccine candidate in monkeys (non-human primates) is an important milestone because it typically predicts the vaccine will work in humans, enabling further clinical development. [Read more.](#)

Mosquito-trapping balloons could help us understand one of the world's deadliest diseases



In West Africa, scientists are deploying balloons which capture mosquitoes and allow the researchers to figure out how high mosquitoes can fly. By doing so, they hope to piece together how the insects and the diseases they carry spread across long distances.



Eventually, this information could be used to contain and eradicate diseases like malaria. [Read more.](#)

Researchers Shine New Light on Disease-Spreading Mosquitoes

Physicists are now exploring laser-based technology traditionally used for studying conditions in the atmosphere -- such as Light Detection and Ranging (LIDAR) -- to shine a light on the subtlest of features of mosquito activity and better track populations that may carry a viral threat. An investigation led by Benjamin Thomas, assistant professor of physics at NJIT, has adopted the use of LIDAR, an infrared optical remote-sensing technology capable of capturing the rate that mosquitoes beat their wings in flight, known as wing beat frequency (WBF). [Read more.](#)

A BITE OF HUMOUR



Thanks very much Gary Clark for this cartoon!

If you wish to know more about Gary and the Swamp [click here.](#)

KNOW YOUR “NON” MOSQUITO



Fungus Gnat (Mycetophilidae)

- Can be the same size as mosquitoes
- Have no proboscis and cannot bite (adults feed on flowers)
- Large round wings
- Very long antennae
- Spikes on legs
- Fungus Gnats develop in fungus (for example compost, pot plants, plant matter) They are known to swarm and are commonly found in light trap samples from routine mosquito surveillance.



NEW ZEALAND BIOSECURE



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. Choose a country to display the current distribution of Malaria.

DISEASE OUTBREAKS

[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.
