



## BORDER HEALTH NEWSLETTER – SEPTEMBER 2020

### WELCOME!

Kia Ora Koutou,

This week SMS will be providing the “Medical vectors surveillance workshop” in Auckland and online. We hope attendees are getting ready to share their experiences and knowledge around mosquito surveillance and also preparing to take notes on the MoH latest recommendations and updates. We are very much looking forward to meeting the course attendees very soon!

In the news this month, scientists from Stanford University in California and Institut Pasteur in Paris developed a tool to study female mosquito behaviour while feeding, this will assist in the comparison of infected mosquitoes vs healthy ones and to monitor mosquito responses to insecticides. Scientists from the University of Liverpool and doctors from Brazil studying the neurological effects of vector borne disease found that patients suffering from Zika and chikungunya simultaneously are more likely to suffer a stroke. Meanwhile, in Maryland researchers have discovered the mechanisms utilized by Zika virus to cause neurological damage. Closer to New Zealand, Australian scientists are looking at the history of aircraft disinsection to highlight the challenges and underline the need for updated evidence to support continuing aircraft disinsection. And more...

In the mosquito of the month section learn about our native mosquito *Culex pervigilans*, a common mosquito usually collected during routine surveillance.

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### SURVEILLANCE

During September 783 samples were collected by staff from 11 DHBs (Figure 1). This month Waikato DHB has suspended surveillance at the airport due to the lack of international flights reaching the area. As advised by the MoH, this is also happening in different airports around the country. The samples included 53 positive larval samples and 4 positive adult samples, leading to a total of 4 adults and 1986 larvae identified over the past month (Table 1). The dominant larval species this month, this year and last year is *Aedes notoscriptus*.

Compared to this same month last year, the total number of larvae and adults has shown an increase (20% and 100% respectively, see Table 1).

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

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

Species (common name)	Adults		Larvae	
	Sep 20	Sep 19	Sep 20	Sep 19
<i>Aedes notoscriptus</i> (striped mosquito)	-	-	1636	1489
<i>Ae. antipodeus</i> (Winter mosquito)	2	-	-	-
<i>Culex pervigilans</i> (vigilant mosquito)	-	-	271	62
<i>Cx quinquefasciatus</i> (southern house mosquito)	2	-	63	25
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	16	11
<b>Total</b>	<b>4</b>	<b>-</b>	<b>1986</b>	<b>1587</b>

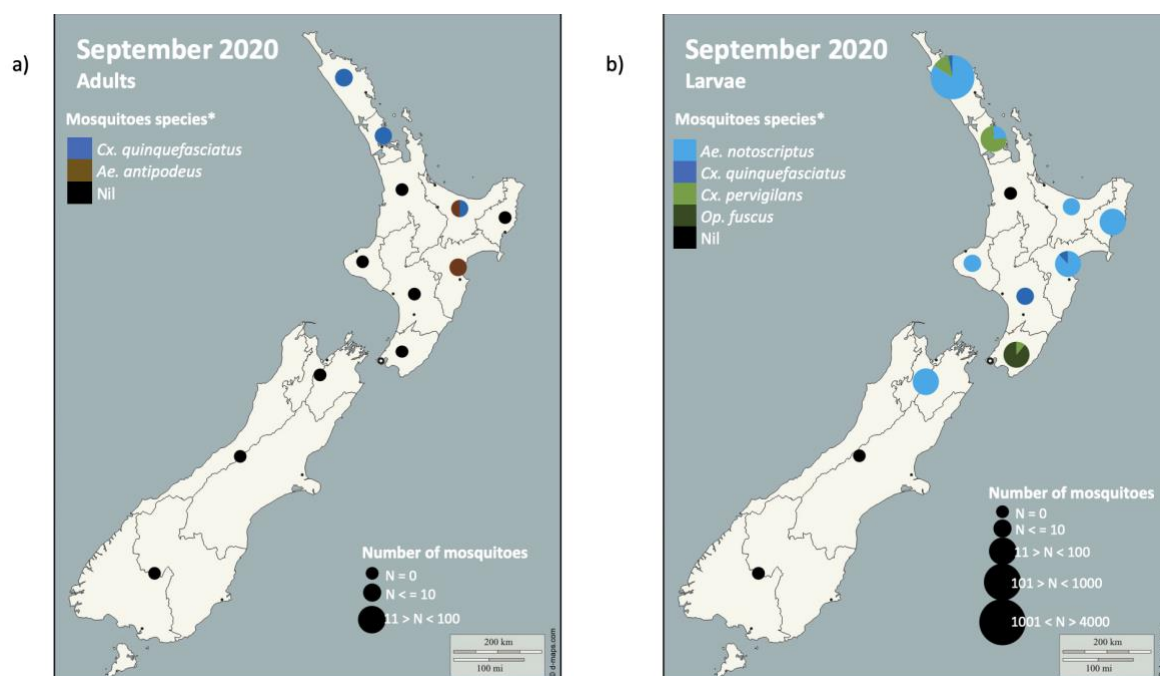


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the September 2020 surveillance period.

\* 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.

Compared to last month, mosquito larval and adult numbers have shown a decrease (3% and 89% respectively (Table 1).

The highest number of larvae sampled this month was obtained in Northland DHB (1767) followed by Nelson Marlborough DHB (83 larvae) (Figure 1).

*Culex quinquefasciatus* larval numbers have shown a decrease in three DHBs from this same month last year and an increase in two DHBs. *Culex quinquefasciatus* has not been found this month in Public Health South (Figure 2).

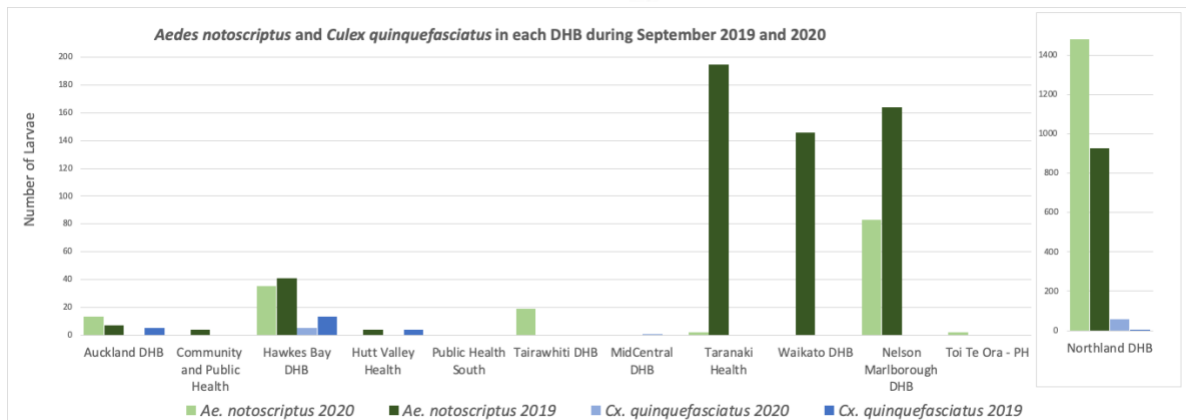


Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during September 2019 and 2020.

\*Please note the different scale for the number of larvae present in Northland DHB in comparison to the other DHBs.

*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). As expected *Aedes notoscriptus* has not been recorded this month, this year or last year in Public Health South (Figure 2).

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

## INCURSIONS AND INTERCEPTIONS

During September one suspected interception has been recorded (Table 2).

Table 2. Suspected interceptions during September 2020.

Date	Species	Location	Circumstances
01.09.2020	Non-mosquito. <i>Sylvicola notatus</i> (Anisopodidae)	Fendalton New World, Christchurch.	Found alive by a member of the public in plastic-wrapped bananas from the Philippines, bought at a New world in Christchurch.

## NEWS ARTICLES FROM AROUND THE WORLD

### Climate change could shift the spread of West Nile virus

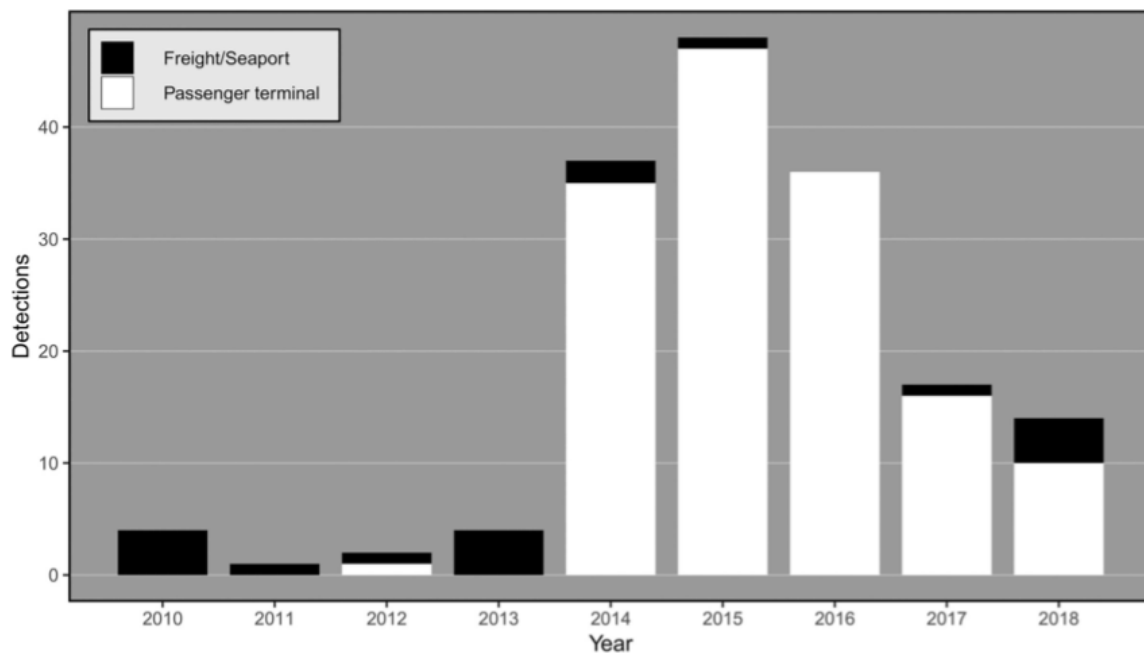
Once again climate change has been shown to have a potential effect on mosquito-borne diseases. This time a study published by researchers at Stanford University in California have looks at how range of West Nile virus may shift as temperatures change. Their focus was in the USA where West Nile virus rapidly becoming an issue. The team looked at the survival, reproduction, development, biting rates of the mosquitoes that carry the virus as well as their ability to transmit it at different temperatures. They found that as temperatures rise, up to 70% of the population of the USA may be within the optimal temperature zone, compared to the current 30%. It is also likely that the transmission period will begin earlier and finish later. [Read more.](#)



## How zika virus degrades essential protein for neurological development via autophagy

In a study at the University of Maryland, researchers have demonstrated how Zika virus causes neurological damage. The virus hijacks the cells machinery to degrade an important protein and initiate cell death, a process known as autophagy. The protein which the virus degrades is a transport protein KPNA2, which the researchers have speculated that this protein may also have some antiviral effects, as well as being important for transporting cellular factors relating to development and cell differentiation in brain development among other things. [Read more.](#)

## Aircraft disinsection: what is the usefulness as a public health measure?



*Aedes aegypti* found per year at Australian international terminals.

Concerns about the introduction of non-endemic mosquitoes vectors reinforce the need for effective preventive measures. Import of disease vectors is likely to occur in the future under changing environmental and operational conditions. Optimal impact from disinsection requires appropriate deployment, commitment and use. The current system of evaluations is inadequate for producing the evidence needed for informed policy decisions. While utilizing results of research into environmentally sustainable vector-control methods for use in aircraft, future approaches to aircraft disinsection require improved evidence of anticipated benefits and harms, reliable monitoring data on insecticide resistance, and must be supported by strong vector control at airports. [Read more.](#)

## Scientists develop new tool for studying the biting behaviour of mosquitoes



*Aedes albopictus*

*Aedes aegypti*

*Anopheles stephensi*

*Anopheles coluzzii*

Click on the photos to watch the mosquitoes feeding.

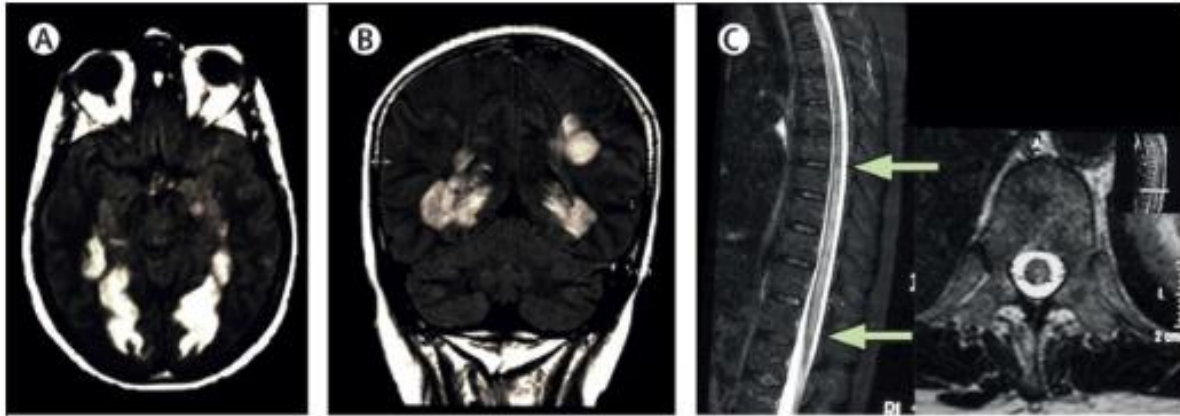
A collaboration of scientists from Stanford University in California and Institut Pasteur in Paris has resulted in the creation the biteOscope, a tool which can be used to study the biting behaviour of mosquitoes. It uses a transparent surface that mimics human skin, along with an artificial blood meal which allows feeding, probing, and general behaviours associated with biting to be captured. The team used four medically important species, *Aedes aegypti*, *Aedes albopictus*, *Anopheles stephensi*, and *Anopheles coluzzii* to test their creation and captured feeding and probing behaviours, as well as looking at how *Anopheles coluzzii* responses to DEET. This will also provide a way to test biting behaviours in mosquitoes infected with diseases such as dengue virus or malaria, as it does not expose a volunteer to the disease. After reading the article, be sure to take a look at the videos provided by the researchers in the additional files!. [Read more. Access original article. Watch more videos.](#)

## Study analyzes link between maternal insecticide use during pregnancy and neonatal jaundice

Researchers in Japan looked at how various forms of insecticide use during pregnancy and the occurrence of neonatal hyperbilirubinemia (also called neonatal jaundice), a condition that affects a large number of new-borns and is significantly more common within Asian populations. They used self-reported questionnaires during the second/third trimesters on the use of various types of pesticides and repellents, including mosquito repellents and coils, and collected data about the health of the baby and hyperbilirubinemia and if it required phototherapy. When controlling for confounding factors, they found that the use of indoor insecticide sprays increased the incidence of neonatal hyperbilirubinemia. While this study is limited by the use of self-reporting, it highlights that the use of insecticides while pregnant should be investigated further. [Read more.](#)



## Mosquito-borne viruses linked to stroke



Neuroimaging findings

Researchers from the University of Liverpool have collaborated with doctors in Brazil looking at the neurological effects of mosquito-borne viruses. They looked at patients who had been admitted to hospital with neurological diseases that were suspected to be linked to Zika and/or chikungunya. It was found that while those infected with these viruses showed a variety of neurological complications, those who were infected with Zika and chikungunya simultaneously and were in the high risk group were significantly more likely to suffer a stroke. [Read more.](#) [Access original article.](#)

## KNOW YOUR MOSQUITO

### *Culex pervigilans*

- Known as the Vigilant mosquito, this species is endemic to New Zealand
- It is widespread and is found throughout New Zealand, including in the Chatham Islands, Auckland Islands, and the Kermadec Islands
- Both the adults and larvae of this species look similar to *Culex quinquefasciatus*, an introduced species
- This species thrives in both rural and urban environments – this is because they are able to utilize many different breeding habitats. These include tyres, bottles, troughs, water tanks, and natural containers
- They can tolerate polluted and brackish water. Larvae are sometimes even found in rock pools!
- Are nocturnal biters – *Culex pervigilans* primary host is birds though they will readily bite humans and other mammals
- Has a high pitch whine when flying





NEW ZEALAND BIOSECURE



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## 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

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## 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

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