



BORDER HEALTH NEWSLETTER

August 2024

NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

Spring has sprung and things have started to look a bit quieter here in the lab with the retrospective samples completed and winter keeping mosquito numbers down. The mosquito numbers can be found below, along with a reminder of what information needs to be recorded for the weather section of the online database in the bite of information.

August is when World Mosquito Day occurs, and you can read more about its origin in the news section. In the news this month, learn about Eastern Equine Encephalitis in the New England states and how Hurricane Beryl has increased mosquito numbers and therefore the risk of mosquito borne viruses in Houston. Then take a look at a genetic modification to sterilise Anopheles mosquitoes and at some fascinating research about the relationship about infrared radiation and host seeking behaviours.



Happy reading!

SURVEILLANCE

During August a total of 1088 routine surveillance and enhanced surveillance samples were collected by staff from 9 PHUs (Figure 1). The samples included 33 positive larval samples and 12 positive adult samples, leading to a total of 1082 larvae and 12 adults identified over the past month (Table 1).

Aedes notoscriptus is the dominant larval species this month, which is the same as August last year and last month (Table 1).

Compared to the same month last year, the total numbers of larvae and adults have shown a decrease (38 and 42 respectively%).

Biosecurity Specialists



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Compared to the previous month, the total number of larvae has shown an increase (3%) while adult numbers have shown a decrease (76%) (Table 1)

Table 1. Adult and larvae sampled by the New Zealand surveillance program during August 2023 & 2024

Species (common name)	Adults		Larvae	
	Aug 24	Aug 23	Aug 24	Aug 23
<i>Aedes antipodeus</i> (winter mosquito)	-	1	-	-
<i>Ae notoscriptus</i> (striped mosquito)	1	-	834	853
<i>Cx pervigilans</i> (vigilant mosquito)	-	2	167	529
<i>Cx quinquefasciatus</i> (southern house mosquito)	8	15	75	365
<i>Culex</i> sp.	2	1	-	-
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	6	-
Total	11	19	1082	1747

The highest number of larvae sampled this month was obtained in Northland (687 larvae) followed by Canterbury (233 larvae) (Figure 1).

In total, four mosquito species have been collected this month (Table 1), same number as collected last month.

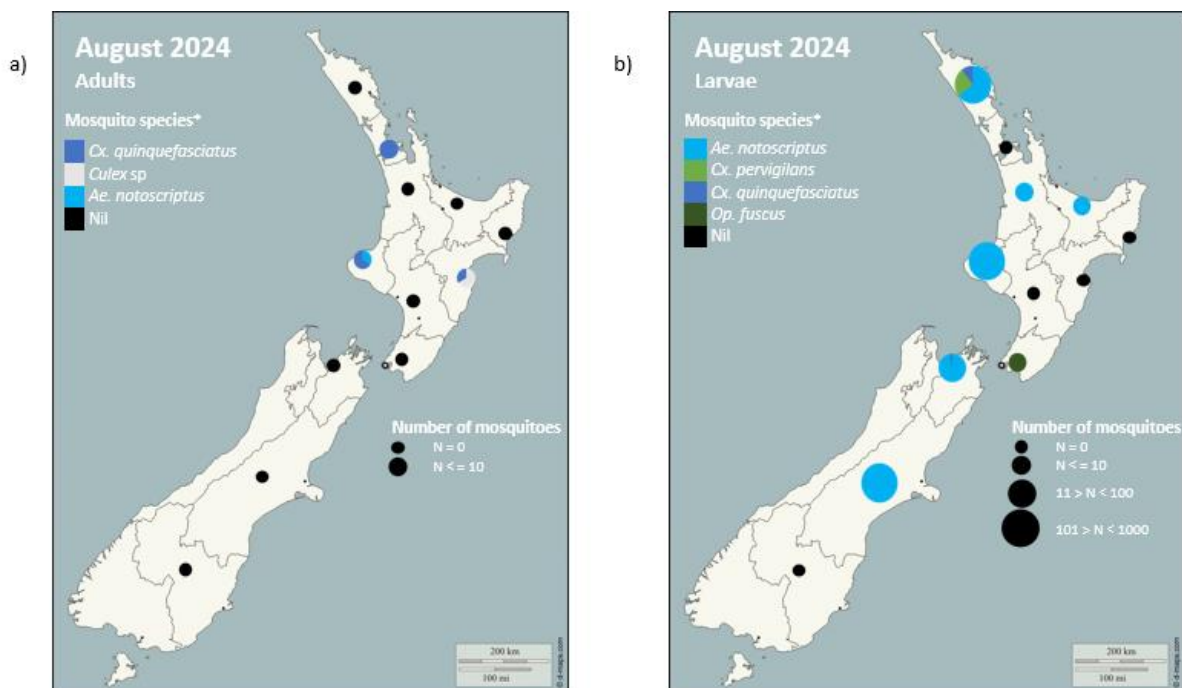


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during August 2024 surveillance period. Please note that the markers represent the PHUs and not the specific sites where the samples have been taken.

* The mosquito species are listed in order from the most abundant to the least abundant.

Aedes notoscriptus larval numbers have shown an increase in five PHUs and a decrease in two PHUs from this same month last year (Figure 2).

As expected, *Aedes notoscriptus* has not been recorded this month, this year, or last year in Southland (Figures 1 and 2).



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Culex quinquefasciatus larval numbers have shown an increase in one PHU and a decrease in four PHUs from this same month last year (Figure 2).

As expected, *Culex quinquefasciatus* larvae have not been recorded this year in Southland (Figures 1 and 2).

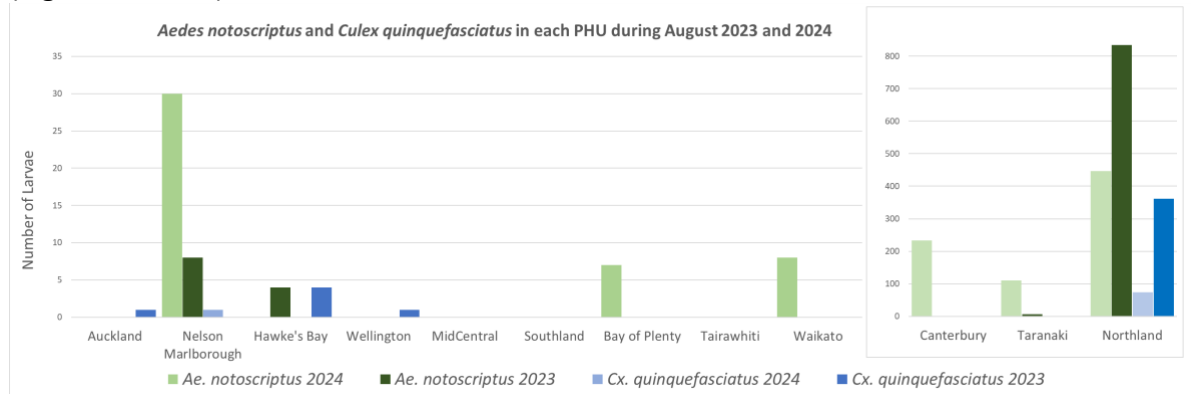


Figure 2. Comparison between introduced mosquito species sampled in each PHS during August 2023 and 2024. *Please note the different scale for the number of larvae present in Northland, Taranaki & Canterbury in comparison to the other PHSs.

INCURSIONS AND INTERCEPTIONS

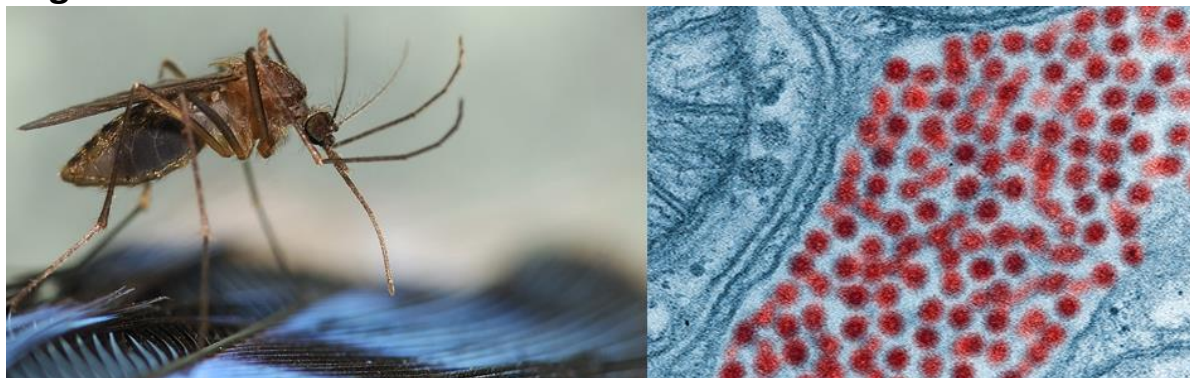
During August, HPOs responded to one suspected interception (Table 2). Northern Region – Auckland have also continued to respond to mosquitoes collected in air cans at Auckland International Airport, with a total of 2 samples collected, resulting in 1 *Culex pipiens molestus/pallens* and 1 *Culex quinquefasciatus*. Nelson Marlborough HPOs also continue their response following the *Culex pipiens f. molestus* found in a routine sample at Nelson Port in May. One further specimen has been collected from an enhanced surveillance trap.

Table 2. Suspected interception during August 2024

Date	Species	Location	Circumstances
05.08.2024	1 Female <i>Culex peus</i>	Simple Freight Services Ltd, Auckland	Mosquito was found dead in a consignment of flowers from Columbia.

NEWS ARTICLES FROM AROUND THE WORLD

Eastern Equine Encephalitis (EEE) outbreak detected in 5 New England states.





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Six cases of Eastern Equine Encephalitis (EEE) have been recorded for the first time in the US since 2020. All cases were contained in the following New England states; Wisconsin, Massachusetts, New Jersey, New Hampshire, Vermont. Although rare, EEE can have severe symptoms such as fever, headache, chills and vomiting. Patients who develop severe symptoms are subjected to a 30% survival rate, and survivors are often left with ongoing neurological issues. [Read more about EEE here, or have a look at an interview with a virologist at Harvard Medical here.](#)

Modified mosquito sterility: a genetic warfare.



In order to combat malaria in Africa, scientists have been experimenting on sterility of mosquitoes through genetic modification. The ongoing experiment involves breeding male mosquitoes with a modified gene that prevents fertilised eggs from hatching. Eventually, the aim of this project is to increase the likelihood that the modified gene will be inherited by its offspring. By using gene drive systems, the 50/50 inheritance chance can be increased up to 99%. Although this project may be in its early stages, it is exciting seeing the development of potential new methods of controlling mosquito borne viruses. [Read more here. Access the journal article regarding field trial considerations here.](#)

Mosquito numbers greatly increase after Hurricane Beryl floods.



After Hurricane Beryl's devastation in Houston, residents have noticed an abnormal increase of mosquitoes. The likely cause of said increased numbers was the cumulation of stagnant water pools from the floods caused by Beryl. Sonja Swiger, an entomologist from the university of Texas further emphasised this point when speaking to the Chronicles, "There's so much moisture and so much water, all of those mosquitoes now have habitats that they can utilize." Naturally, the increase of mosquitoes comes with the increase of mosquito



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borne diseases. According to Harris County Public Health, there are 23 reported cases of West Nile Virus in humans, 615 positive mosquitoes, and 27 dead birds tested positive. Although mosquitoes may seem insignificant due to their size, we are reminded of why they hold the title of the world's deadliest animal. [Read more about the increase in mosquito numbers here.](#) [Read more about the cases of West Nile Virus here.](#) [And read the account of a man in Houston who contracted WNV here.](#)

Mosquitoes detect infrared radiation for host seeking

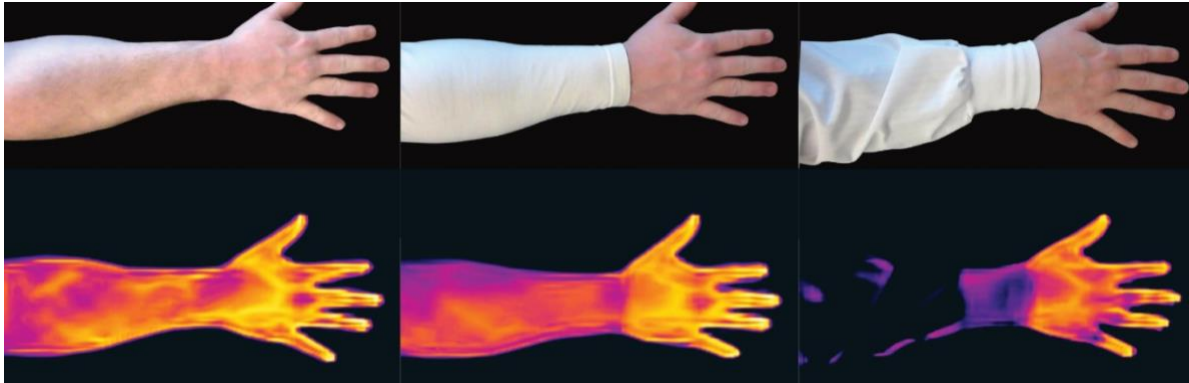


Figure 1 The amount of IR radiation let through by different mediums of clothing (Photo Credit DeBeaubien and Chandel et al.)

Mosquitoes host seeking behaviours are a heavily researched topic, being the primary subject of mosquito trapping. A study exploring the potential of thermal infrared radiation as a new attractant for mosquitoes were conducted by a team at University of California, led by Santa Barbara.

The experiment was conducted with putting female mosquitoes in 2 zones, both exposed to human odours and CO₂ at the rate we breathe. One of the zones were also exposed to IR at the source at skin temperature. Then they counted the number of mosquitoes probing for a vein. Adding thermal IR from a 34° Celsius source (about skin temperature) doubled the insects' host-seeking activity. The team discovered it remains effective up to about 70 cm (2.5 feet).

With these discoveries, changes may be made to current mosquito control strategies. Traps may begin to integrate thermal IR sources, increasing their attractant effectiveness. Wearing looser clothing have also been shown to disperse IR (as shown in Figure 1.), reducing attractiveness to the mosquitoes. These findings may prove to be pivotal in reducing the prevalence of mosquito borne diseases. [Read more here.](#) [Access the journal article here.](#)

World Mosquito Day

July 1897, Sir Ronald Ross cultivated and infected 20 “large brown mosquitoes” (later described to be the ‘*Anopheles*’ genus) with malaria. On August 20th, 1897, he confirmed the presence of malarial parasites in the anopheles’ gut. This day was then marked as the ‘world mosquito day’, where mosquito borne diseases such as dengue, Zika, yellow fever and chikungunya are acknowledged.



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The world mosquito program is a non-profit global organisation that aims to protect our communities from mosquito borne diseases. They are most well known for their development of *Wolbachia*, a bacterium that blocks viruses like dengue, chikungunya and Zika from growing in the bodies of *Aedes aegypti* mosquitoes. The most recent trial in Yogyakarta showed an impressive 77% reduction in dengue incidence and a 86% reduction in dengue hospitalisations in *Wolbachia* treated areas compared with untreated areas. [Read more about the history of world mosquito day here.](#) [Read more about *Wolbachia* here](#) and [a study relating to the effectiveness of *Wolbachia* here.](#)

A BITE OF INFORMATION

Remember that ALL the fields in the weather section of the database needs to be filled out

Recording the weather conditions is a requirement for the use of S-methoprene

If using a CSV add the weather and time to the comments without commas

WHAT'S THE WEATHER LIKE TODAY??

The time section doesn't have to be the specific time the trap was visited. The period spent at the PoE is sufficient

Pick the conditions that best fit the general surveillance period

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

[Malaria](#) – World Health Organisation



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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
