New Zealand BioSecure

BORDER HEALTH NEWSLETTER

MARCH 2025

NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

We hope everyone is keeping safe and dry as the weather has started to cool down and autumn brings wetter weather. Have a look below to see how this has is effected the mosquito numbers in the surveillance section.

In the news this month, read about how the disruption of a protein system in Anopheles mosquitoes reduces the mosquitoes' ability to host and transmit malaria. Also, learn about the emerging threat of Oropouche virus. Discover more about Zika virus and dengue virus and their distinct strategies for infecting their hosts. Finally, learn about nitisione, a drug traditionally used for treating rare genetic disorders, as a potential tool for controlling Anopheles mosquito populations.

We hope everyone took some notes from the bite of information section last month because as promised, this month we have a pop quiz on data entry into the online database. Don't worry, if you didn't, we have also included a link to the guidelines for using the database, a handy resource for if you are ever unsure about how to use the database. Good luck! Get some inspiration for your next picture by having a nosey at the best picture of the month. Thank you, Cheong Ping Pau (public enquiry), for sending it alongside an incredible video of the mozzie walking on a table.

Happy reading!

SURVEILLANCE

During March 1734 samples were collected by staff from 12 NPHUs (Figure 1). The samples included 291 positive larval samples and 181 positive adult samples, leading to a total of 14263 larvae and 1076 adults identified over the past month (Table 1).

Culex quinquefasciatus is the dominant larval species this month, which is the same as this month last year and last month (Table 1)

In total, six mosquito species have been collected this month (Table 1), that is the same number than collected last month.

Compared to this same month last year, the total number of larvae have decreased (23%) and the total number of adults have shown a decrease (22%) (Table 1).

Compared to the previous month, mosquito larval number have shown a decease (9%) and adult numbers have shown an increase (41%).

Table 1. Adult and larvae sampled by the New Zealand surveillance program during March 2024 & 2025

Species (common name)	Adults		Larvae	
	March 25	March 24	March 25	March 24
Aedes antipodeus (winter mosquito)	4	-	-	-
Ae australis (saltwater mosquito)	2	1	-	-
Ae notoscriptus (striped mosquito)	41	15	3112	5632
Culex asteliae (no common name)	-	-	-	3
Cx pervigilans (vigilant mosquito)	16	15	790	718
Cx quinquefasciatus (southern house mosquito)	924	792	9632	12079
Culex sp.	89	53	122	-
Opifex fuscus (rock pool mosquito)	-	2	607	58
Total	**1076**	**878**	**14263**	**18490**

The highest number of larvae sampled this month was obtained in Northland (5700 larvae) followed by Bay of Plenty (3024 larvae) (Figure 1).

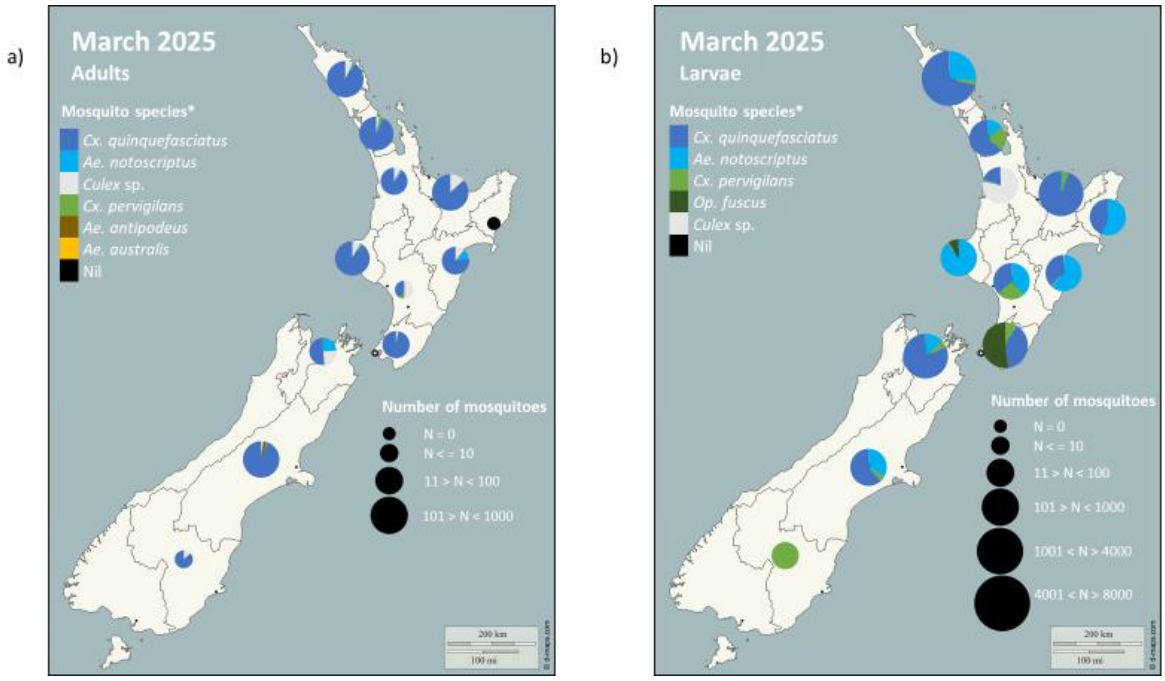

Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during March 2025 surveillance period. Please note that the markers represent the NPHUs and not the specific sites where the samples have been taken.
* The mosquito species are listed in order from the most abundant to the least abundant.

Aedes notoscriptus larval numbers have shown an increase in three NPHUs and a decrease in seven NPHUs, and remained the same in two NPHUs compared to the same month last year (Figure 2).

Aedes notoscriptus was not recorded this month this year in Southland (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in five NPHUs, a decrease in six NPHUs, and remained the same in one NPHUs compared to the same month last year (Figure 2).

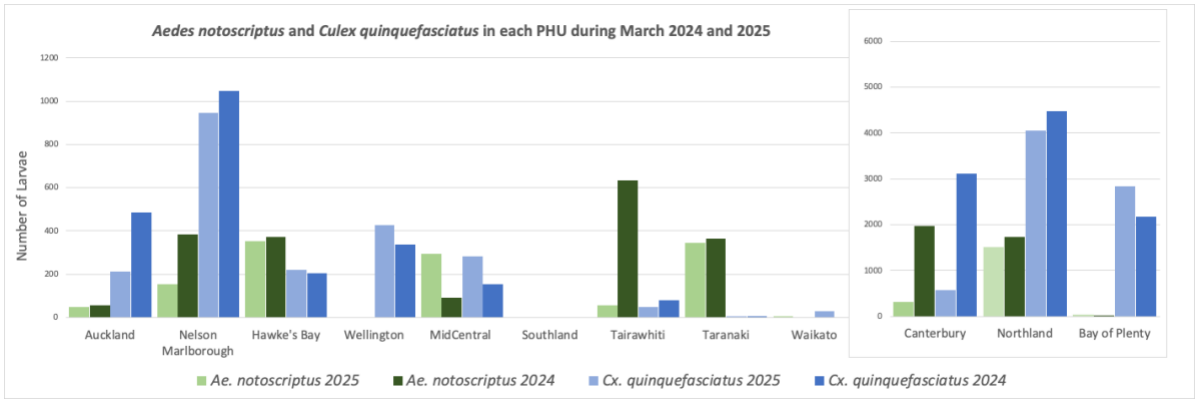

Figure 2. Comparison between introduced mosquito species sampled in each NPHU during March 2024 and 2025. *Please note the different scale for the number of larvae present in Canterbury, Northland and Bay of Plenty in comparison to the other NPHUs.

INCURSIONS AND INTERCEPTIONS

During March, HPOs responded to twelve suspected interceptions. This included the discovery of an unwanted species, *Anopheles atroparvus* (shown in red) in a vehicle from overseas, one of a *Culex quinquefasciatus* of exotic origin (shown in green), and one of an exotic species not on the unwanted list, *Culex vagans* (shown in blue). The remaining nine were all locally occurring species.

Table 2. Suspected interception during March 2025

Date	Species	Location	Circumstances
05.03.2025	1 Female *Culex quinquefasciatus*	Auckland international Airport	Found alive within the 400m delimiting survey area of the ongoing *Ae aegypti* response.
05.03.2025	1 Female *Anopheles atroparvus*	Famous Pacific Shipping, Auckland	Found dead in a vehicle from the UK, with all its windows closed during the voyage. The most recent port of call was Melbourne, Australia.
07.03.2025	1 Female *Culex quinquefasciatus*	Conroy Removals, Auckland	Found alive during inspection of untreated household goods from Brisbane, Australia.
07.03.2025	1 Non-mosquito (fungus gnat)	Big Save Transitional Facility, Wainuiomata	Found alive in a container of appliances from Vietnam.
08.03.2025	1 Male *Culex quinquefasciatus*	Bledisloe Wharf, ports of Auckland	Found alive in boot of a prior to departure cleaned and heat-treated car from Japan.
15.03.2025	1 Female *Culex pervigilans*	Baggage room, Auckland international airport	Found alive by MPI officer in the airport baggage room
18.03.2025	1 Female *Culex vagans*	Tauranga Port	Found dead during a ship inspection of Vessel SE Nicky, in the officer's mess room on the windowsill.
18.03.2025	1 Non-mosquito (chironomid)	Tauranga Port	Found dead during a ship inspection of Vessel Maersk Monte Lascar, in the medical room on the windowsill.
20.03.2025	1 Female *Culex* sp.	Tauranga Port	Found drowned in a tyre aboard the vessel Belle Lune at Tauranga Port (Berth 9) during a ship inspection.
21.03.2025	No specimen	Crown Equipment, Hamilton	Flying insects and ants spotted when 8 units of a container transporting new vehicles (forklifts) were opened. Container was closed, and vents sealed, then sprayed. No samples were collected.

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Date	Species	Location	Circumstances
24.03.2025	3 Non-mosquitoes (gnats)	Mainfreight Air and Ocean, Auckland	Found dead in a consignment of flowers from Columbia.
26.03.2025	1 Male *Culex quinquefasciatus*	Famous Pacific Shipping, Auckland	A live mosquito was found inside a vehicle in a container from UK. Windows were closed through all the voyage aside from inspections. Transitional facility was last fumigated on 18 March 2025. Window was left open at the transitional facility

NEWS ARTICLES FROM AROUND THE WORLD

Nitisinone: A promising new tool for malaria control

A recent study published in *Science Translational Medicine* has identified **nitisinone**, a drug traditionally used for treating rare genetic disorders, as a potential tool for controlling mosquito populations and combating malaria. Researchers found that when patients take nitisinone, their blood becomes toxic to mosquitoes, particularly *Anopheles gambiae*, the primary malaria vector. The drug works by blocking an enzyme that mosquitoes need to properly digest blood, leading to their quick death. Compared to ivermectin, a commonly used mosquito control drug, nitisinone has a longer half-life in the bloodstream, ensuring its effectiveness over a longer period. The study suggests that nitisinone could complement ivermectin in malaria control, especially in regions where ivermectin has already been overused. Furthermore, using nitisinone as an insecticide could also benefit the treatment of rare genetic disorders it was originally designed for by increasing drug production and therefore lowering costs for patients.
Read more here or here.

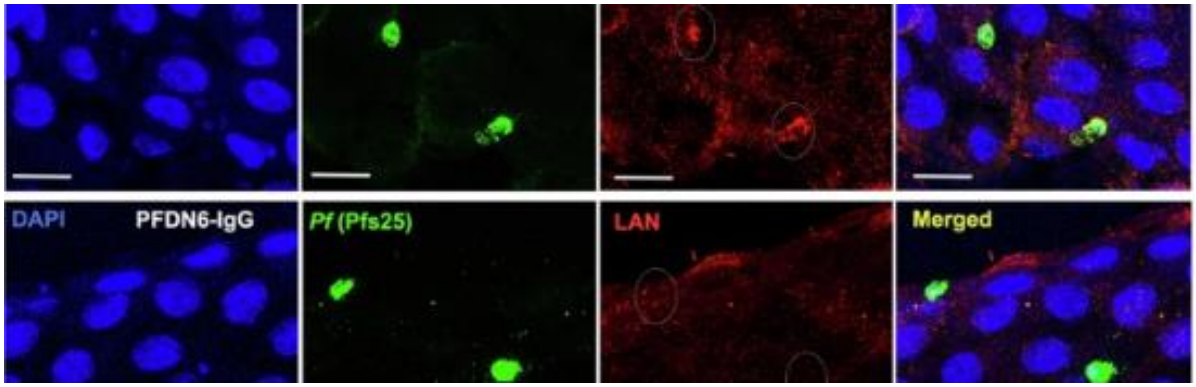
Emerging threat of Oropouche virus

A recent study in the *Canadian Medical Association Journal* highlights the emerging threat of Oropouche virus, which has been reported in travellers returning from regions like Bolivia, Brazil, Cuba, and Peru. The virus, transmitted by *Culicoides paraensis* midges and *Culex quinquefasciatus* mosquitoes, causes symptoms such as fever, chills, headache, and myalgia, with more severe cases leading to maculopapular rash, abdominal pain, and aseptic meningoencephalitis. Oropouche virus may also cause adverse pregnancy outcomes, including birth defects. While sustained transmission in the U.S. is unlikely due to environmental factors, the virus has been detected in one patient's semen, indicating potential sexual transmission. Preventive measures include insect repellents, mosquito nets, and wearing long-sleeved clothing. Pregnant individuals and those planning pregnancies should also consider deferring travel to areas from where Oropouche outbreaks have been reported. There is currently no vaccine or antiviral treatment. The World Health Organization is actively monitoring the situation.
Read more here or here. Discover more about Oropouche virus found in semen here.

Zika vs. dengue: understanding their unique immune evasion strategies

A study published in *Nature Communications* led by researchers from La Jolla Institute for Immunology (LJI) and UC San Diego reveals how **Zika virus** and **dengue virus**, though closely related, have distinct strategies for infecting their hosts. Zika virus uses a stealth approach by blocking dendritic cells from alerting the immune system, preventing T cells from responding to the infection. In contrast, dengue virus triggers a strong immune response by promoting the production of pro-inflammatory cytokines, leading to an overactive immune reaction. This research helps explain why Zika often results in a weaker immune response compared to dengue. The findings also shed light on Zika's ability to evade immune defenses in the placenta and infect developing fetuses. These insights are crucial for developing vaccines and antiviral treatments targeting these viruses, as current options remain unavailable. Researchers are working on a "pan-flavivirus" vaccine that could combat multiple related viruses, including Zika and dengue, to address the growing threat of mosquito-borne diseases.
Read more here or here.

Targeting mosquito protein system offers new hope for malaria control



A study led by researchers at the Johns Hopkins Bloomberg School of Public Health has identified a promising malaria-control strategy by targeting the prefoldin chaperonin system in *Anopheles* mosquitoes, which is essential for malaria parasites to progress through their lifecycle within the mosquitoes. Disrupting this prefoldin chaperonin system significantly reduces mosquitoes' ability to host and transmit malaria, killing about 60% of mosquitoes in lab experiments. This method was effective across multiple *Anopheles* species and various malaria parasites, including *Plasmodium falciparum* and *Plasmodium vivax*. The researchers suggest that a future vaccine inducing humans to produce anti-prefoldin antibodies could disrupt this system in mosquitoes, blocking parasite transmission. This strategy could be highly effective globally, difficult for mosquitoes to develop resistance against, and may offer a way to overcome current challenges with insecticide resistance and limited vaccine efficacy.

Read more here or discover the research paper published in *Nature Microbiology* here.

A BITE OF INFORMATION

We told you there would be a test! Now, take out your notes and click on the picture below to start. If you need a refresher, read through the Guideline here or read February 2025 Newsletter's Bite of Information.

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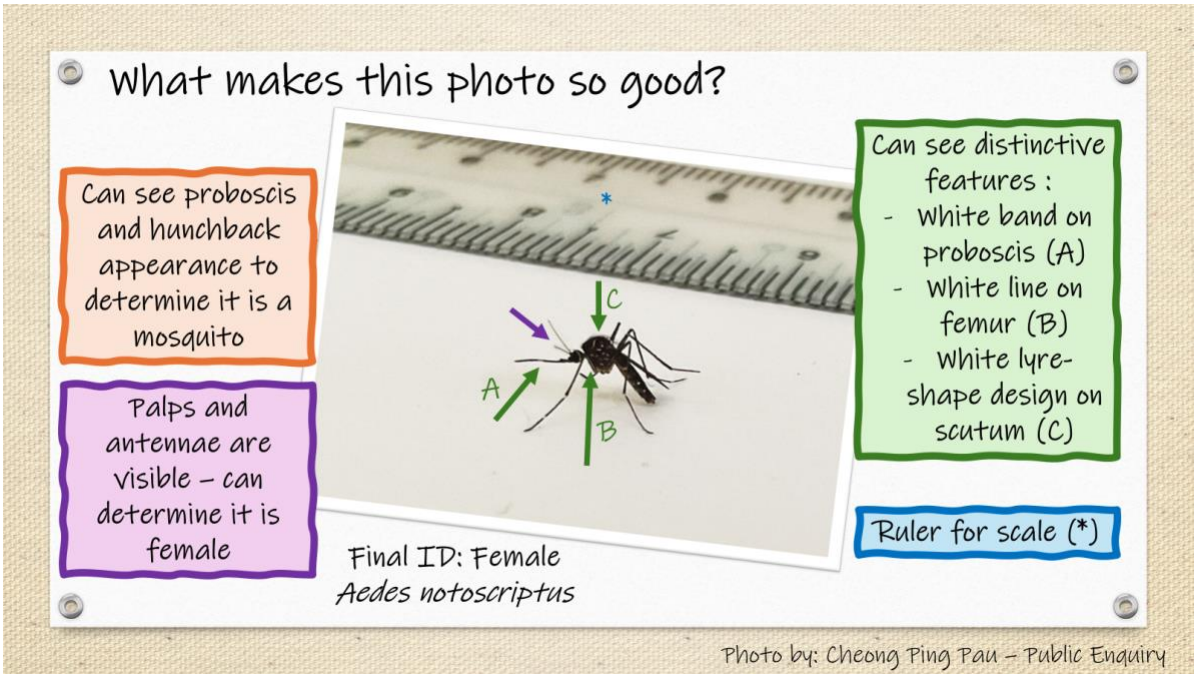
BEST MOZZIE PHOTO OF THE MONTH



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

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.

Communicable disease threats report - European Centre for Disease Prevention and Control