New Zealand BioSecure

BORDER HEALTH NEWSLETTER

FEBRUARY 2025

NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

As we pass through our warmest (and busiest) period, the mozzies have certainly come to the party! In the surveillance section below, you will see that while mosquito numbers have risen compared to last month, they are still lower than they were at this time last year. Keep scrolling to check out the boom in our interception numbers too!

We are also saying goodbye to entomologist Lachlan Gilbert who is off to travel the world at the end of March. We will miss having him in the lab and wish him all the best (and expect some fun mozzie photos)!

In the news this month, read about how a long standing anti-malarial drug could be used to help fight cancer. Also, learn about the impressive mechanics of mosquito antennae and their potential for scientific discovery. Discover more about Zika virus with a study on the mechanisms the virus uses to infect a human fetus. Finally, explore how climate change factors, such as temperature, rainfall, and dry seasons, affect dengue transmission.

In the bite of information section this month, check out Data 101 for everything you need to know when entering your sample data. **Take notes, there will be a test later**! Wondering how to take the perfect mozzie photo? Have a look at the mozzie photo of the month taken by Cassandra Halligan (MPI, Wellington) during an interception and take your skills to next level.

Happy reading!

SURVEILLANCE

During February 1191 routine samples were collected by staff from 12 NPHUs (Figure 1). The samples included 243 positive larval samples and 165 positive adult samples, leading to a total of 15715 larvae and 764 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 two less than collected last month.

Compared to this same month last year, the total number of larvae and adults have shown a decrease (60% and 9% respectively) (Table 1).

Compared to the previous month, mosquito larval and adult numbers have shown an increase (23% and 94% respectively).

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

Species (common name)	Adults		Larvae	
	Feb 25	Feb 24	Feb 25	Feb 24
Aedes antipodeus (winter mosquito)	4	-	-	-
Ae australis (saltwater mosquito)	2	-	-	1
Ae notoscriptus (striped mosquito)	47	25	4286	5165
Culex asteliae (no common name)	-	-	-	1
Cx pervigilans (vigilant mosquito)	21	25	1722	2388
Cx quinquefasciatus (southern house mosquito)	656	755	9456	31885
Culex sp.	34	30	3	-
Opifex fuscus (rock pool mosquito)	-	-	248	87
Total	**764**	**835**	**15715**	**39527**

The highest number of larvae sampled this month was obtained in Canterbury (4380 larvae) followed by Northland (2514 larvae) (Figure 1).

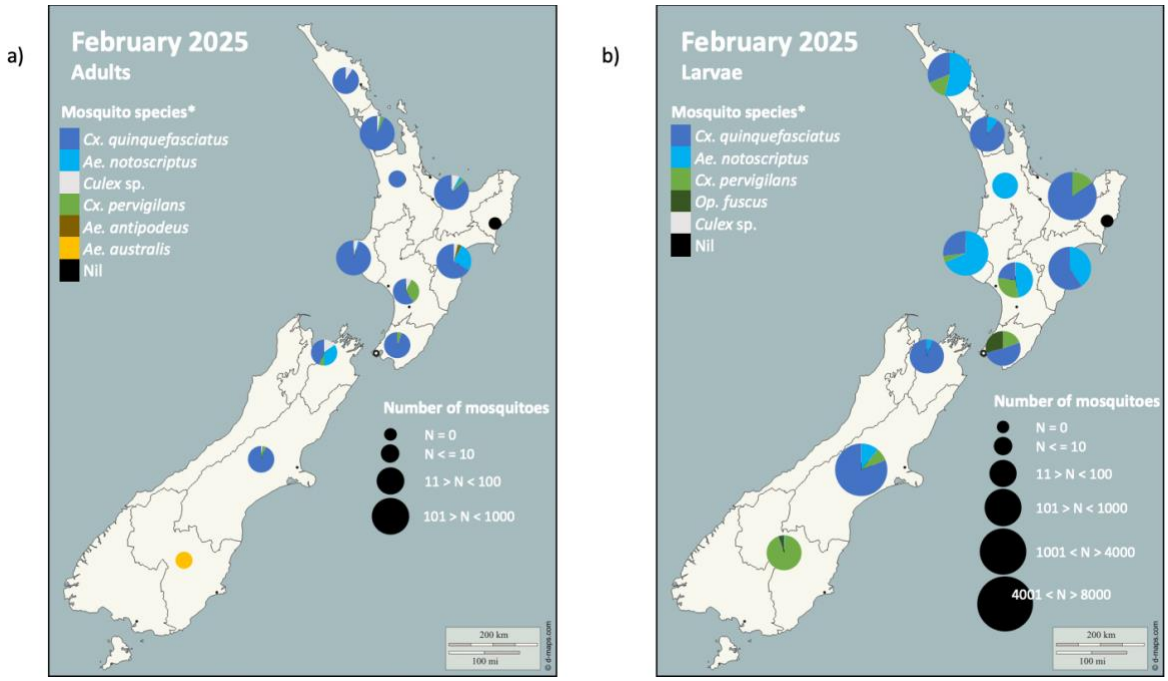


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during February 2025 surveillance period. Please note that the markers represent the NPHUs and not the specific sites where the samples have been taken.
* The mosquito species are listed in order from the most abundant to the least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

Aedes notoscriptus larval numbers have shown an increase in four NPHUs and a decrease in seven NPHUs from this same month last year (Figure 2).

Aedes notoscriptus was recorded this month this year in Southland (Figure 2).

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

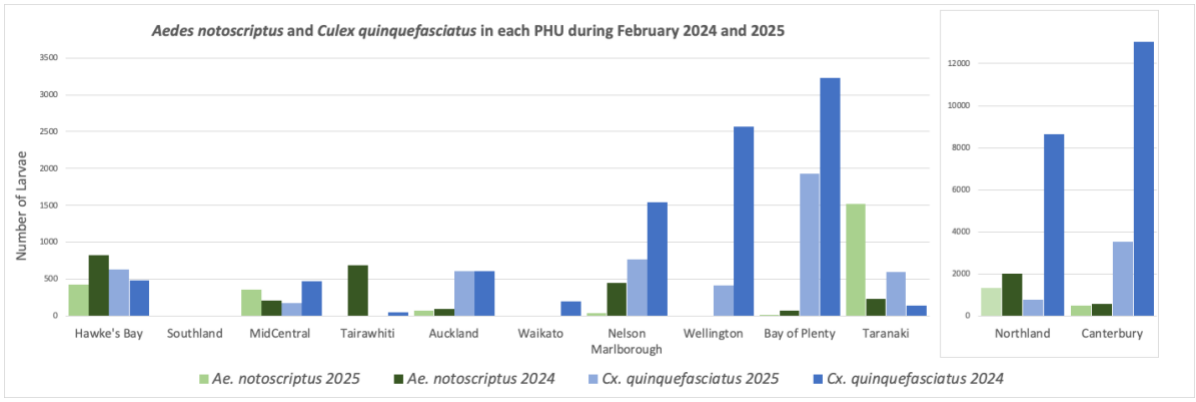


Figure 2. Comparison between introduced mosquito species sampled in each NPHU during February 2024 and 2025. *Please note the different scale for the number of larvae present in Northland and Canterbury in comparison to the other NPHUs.

INCURSIONS AND INTERCEPTIONS

During February, HPOs responded to thirteen suspected interceptions. This included the discovery of an unwanted species, *Aedes aegypti* (shown in red) in a routine surveillance trap, one interception of various exotic *Culex* species (shown in blue & green), and one with the *Culex quinquefasciatus* very likely of exotic origin (shown in purple). The remaining ten were all locally occurring species.

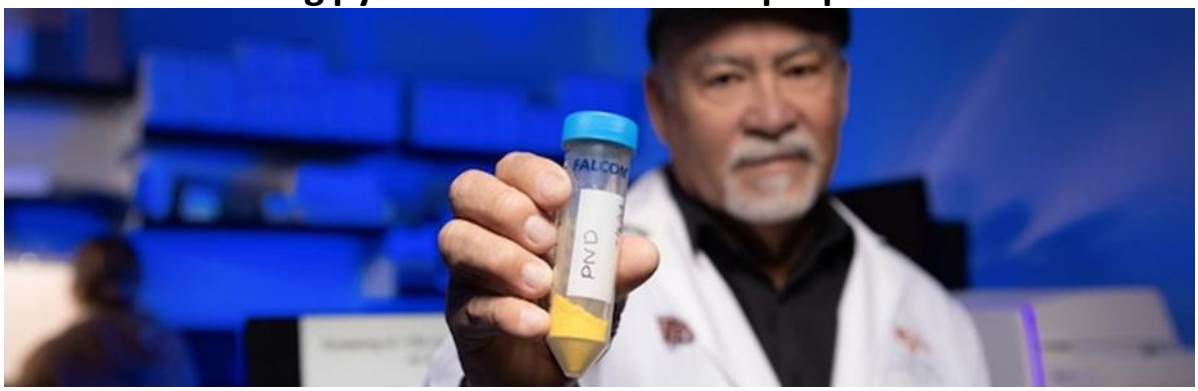
Table 2. Suspected interception during February 2025

Date	Species	Location	Circumstances
01.02.2025	1 Female *Culex quinquefasciatus*	Wellington International Airport	Found alive in the MPI staff bathroom at Wellington International Airport. The most recent international flights were from Australia the night before.
02.02.2025	1 Female *Culex quinquefasciatus*	Wellington International Airport	Found dead near the detector dog room at Wellington International Airport, near where bags are checked by MPI. The most recent international flights were from Australia the night before.
02.02.2025	1 Male *Culex quinquefasciatus*	Wellington International Airport	Found alive in the MPI inspection area at Wellington International Airport while a flight from Melbourne was being processed.
03.02.2025	1 Female *Culex pervigilans*	Wellington International Airport	Found alive in the MPI staff bathroom at Wellington International Airport (same bathroom as the find on 01/02/25). The most recent international flights were from Australia the night before.
06.02.2025	1 Female *Culex quinquefasciatus*	Mainfreight Air and Ocean Auckland	Found alive in inspection room at TF while inspecting taro from Fiji.
07.02.2025	1 Male *Culex quinquefasciatus*	Wellington International Airport	Found alive in the international processing area at Wellington International Airport. Due to multiple interceptions in the vicinity, drains were treated with *Bti*, and an environmental survey was carried out.
12.02.2025	1 Female *Culex quinquefasciatus*	Sanitarium Health and wellbeing, Auckland	Found dead in a container of rice from Sydney Australia. Container arrived at POAL on 28/01/25 after approximately 14 days at sea.
19.02.2025	1 Female *Culex quinquefasciatus*	Ports of Auckland, Cruise Ship Terminal	Found alive in open air shed area at Ports of Auckland during clearance and processing work for the cruise vessel Celebrity Edge. Last port of call was Pago Pago, American Samoa.

Date	Species	Location	Circumstances
21.02.2025	1 Female *Culex pervigilans*	Auckland International Airport	Found alive at Auckland International Airport in the Eastern Baggage area of the Departure Terminal and was not associated with any goods/passenger/flights.
22.02.2025	1 Male *Culex* sp. (damaged)	Auckland International Airport	Caught alive by an MPI officer in the inspection area at Auckland International Airport by the arrivals area. The mosquito was as not associated with any goods/passengers and no passengers had been through in the 15 minutes prior and only one passenger had been processed for about 30 minutes prior to this.
22.02.2025	1 Female *Culex whitei*; 1 Female *Culex vishnui*; 2 Female *Culex quinquefasciatus*, 1 Male *Culex quinquefasciatus*; 1 *Culex* sp (thorax and head)	Ports of Auckland	Multiple found dead in shrink wrap on several cars from Thailand, as well as inside the vehicles at the Ports of Auckland.
24.02.2025	1 Male *Culex quinquefasciatus*	Mixport Logistics and Transport Ltd	Found alive flying in a container of mixed goods from China which had been open for 3 hours when the mosquito was spotted.
27.02.2025	1 Female *Aedes aegypti*	Auckland International Airport	Caught in a routine surveillance trap at Auckland International Airport.

NEWS ARTICLES FROM AROUND THE WORLD

Anti-malarial drug pyronaridine could be repurposed to treat cancer



A new potential cancer treatment may have been discovered through an anti-malarial drug that has been used to treat malaria for the past 30 years. Renato Aguilera, Ph.D., UTEP professor of biological sciences noticed that the structure of Pyronaridine could be useful in fighting cancer. "With pyronaridine, we have the trifecta: slowed growth of cells, programmed cell death, and minimal impact to healthy cells," Aguilera said. "In the future, this drug could potentially be used in combination with immunotherapy to speed up the process of killing cancer cells." Trials on terminally ill patients have proven to be effective in prolonging longevity. However, further tests are still required before this treatment is integrated into standardised cancer treatment.
Read more about the topic here.

BORDER HEALTH NEWSLETTER

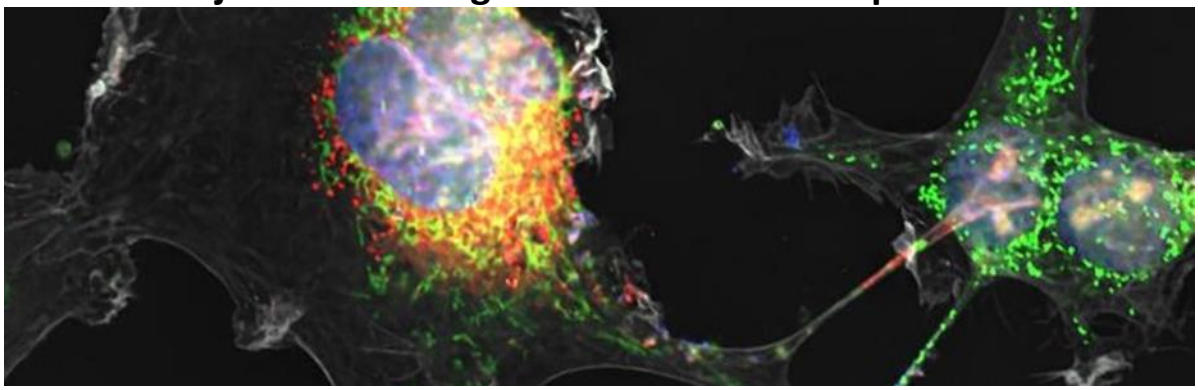
Mosquito antennae Potential for future scientific research

Mosquito antennae are known to be extremely sensitive, picking up vibrations and frequencies so precise that they can detect the sex and species of other mosquitoes. A research team at the University of Purdue are recreating these antennae to study the mechanics of these structures and potentially harness their abilities. According to Pablo Zavattieri, a professor at Purdue, insights from mosquito antennae could also inform the development of smart noise-cancelling materials.

"In times of crisis - such as earthquakes or other disasters - these sensors become invaluable, swiftly detecting faint signals of distress and guiding rescue efforts to those in need."

Read more about the topic here, access the full scientific article here.

Zika virus hijacks tunnelling mechanism to infect placental cells



Zika virus is known to cause congenital zika syndrome and other birth defects. In the US, 5% of all babies born to women infected with zika are affected with zika-associated birth defects. These defects range from smaller than expected head size, called microcephaly, to seizures. Usually, the placenta forms a barrier to protect the fetus from microbes, chemicals and other harmful materials. Zika virus for some unknown reason seem to be able to bypass this security and affect the fetus regardless. Recently researchers discovered that zika virus build a series of tunnelling nanotubes to transfer viral particles to infect the placental cells. Understanding the mechanics of the fetal infection of zika is the first step to developing a vaccine or treatment for this virus.

Figure above shows Zika virus's non-structural protein NS1 (red) and mitochondria (green) travel through the tunnelling nanotube (TNT, gray) from infected to uninfected placental cells. This is the first time that Zika virus NS1 has been shown to induce TNT formation, suggesting a new avenue by which this and other microbes can cross the placental barrier and infect the fetus during pregnancy. Image courtesy of the Mysorekar lab.

Discover more about this topic here.

The Hidden Drivers of Dengue: Understanding the Role of Temperature, Rainfall, and Dry Seasons

Dengue is becoming a greater threat as cases rise at an unprecedented rate, increasing from 4.1 million in 2023 to over 10.6 million in 2024 in North and South America alone. A research team led by Professor Kim Jae Kyoung from KAIST and the Institute for Basic Science (IBS) has uncovered new insights into how climate factors, particularly temperature and rainfall, influence the spread of dengue fever. The study analysed regions in the Philippines and Puerto Rico, revealing that rising temperatures consistently increase dengue incidence, while rainfall's impact varies by location. In regions with shorter dry seasons, rainfall tends to reduce dengue spread, while in areas with longer dry seasons, sporadic rainfall creates new breeding sites, resulting in outbreaks. This study further highlights the impact of climate change and the current effect it has on disease transmission.
Read more on this topic here. Read more on Dengue here.

A BITE OF INFORMATION

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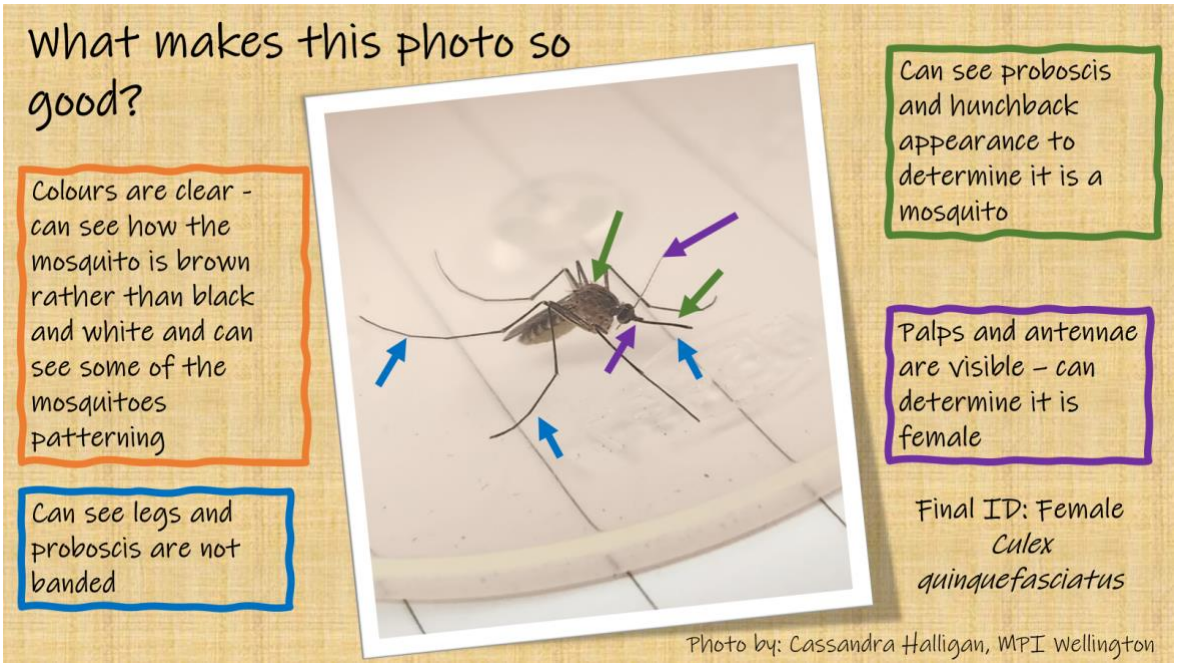
BEST MOZZIE PHOTO OF THE MONTH



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