



BORDER HEALTH NEWSLETTER – APRIL 2022

NAU MAI, HAERE MAI - WELCOME!

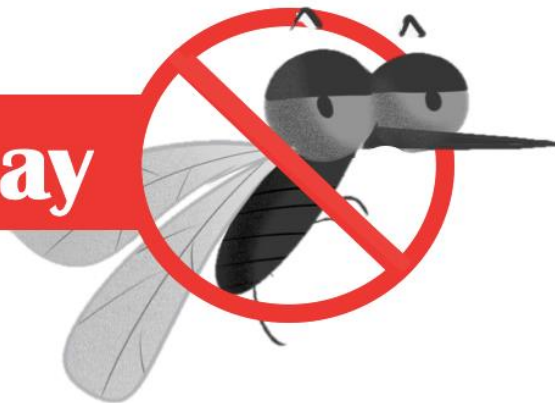
Kia ora koutou katoa,

On the 25th of April World Malaria Day was observed. Malaria is a preventable and treatable disease that continues to have a devastating impact on the health and livelihood of people around the world. In 2020, there were an estimated 241 million new cases of malaria and 627 000 malaria-related deaths in 85 countries. More than two thirds of deaths were among children under the age of 5 living in the WHO African Region. Urgent and concerted action is needed to set the world back on a trajectory toward achieving the 2030 targets of the [WHO global malaria strategy](#).

World

Malaria Day

25 April



In the news this month, learn more about the malaria vaccine that has proven to be a safe and effective way to substantially reduce deadly severe malaria. Also, look at how the immune system acts to protect the body after malaria infection and the implications it may have in the development of more effective vaccines. In further immunity news, read about the research exploring the relationship between the mosquito bite and the immune reaction and how it shapes the establishment of infection, then read about pathogenesis and how a single mutation in the Zika virus could spark a major outbreak. Finally, learn about the preliminary results of the first open study of genetically modified *Aedes aegypti* in the USA and find out how nanoparticles could be used to fight insecticide-resistant mosquitoes.

Think you know your facts about mosquito biology and surveillance? Test out your skills with our mozzie crossword!

Happy reading!

SURVEILLANCE

During the month of April, 1024 routine samples were collected by staff from 11 DHBs (Figure 1). The samples included 155 positive larval samples and 92 positive adult samples, leading to a total of 3143 adults and 11050 larvae identified over the past month (Table 1). The dominant larval species this month is *Culex quinquefasciatus*, the same as last year (Table 1).

Table 1. Adult and larvae sampled by the New Zealand surveillance program during April 2021 & 2022

Species (common name)	Adults		Larvae	
	Apr 22	Apr 21	Apr 22	Apr 21
<i>Aedes antipodeus</i> (winter mosquito)	9	-	-	-
<i>Ae notoscriptus</i> (striped mosquito)	913	-	2655	1072
<i>Ae subalbirostris</i> (no common name)	-	-	-	4
<i>Coquillettidia iracunda</i> (no common name)	20	-	-	-
<i>Culex</i> sp. (likely <i>quinquefasciatus</i> or <i>pervigilans</i> , missing key ID features)	21	15	1	-
<i>Cx asteliae</i> (no common name)	-	-	2	-
<i>Cx pervigilans</i> (vigilant mosquito)	245	17	249	584
<i>Cx quinquefasciatus</i> (southern house mosquito)	1933	358	8018	4778
<i>Culiseta tonnoiri</i> (no common name)	2	-	-	-
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	125	35
Total	3143	390	11050	6473

In total, eight mosquito species have been collected this month (Table 1), one less than collected last month.

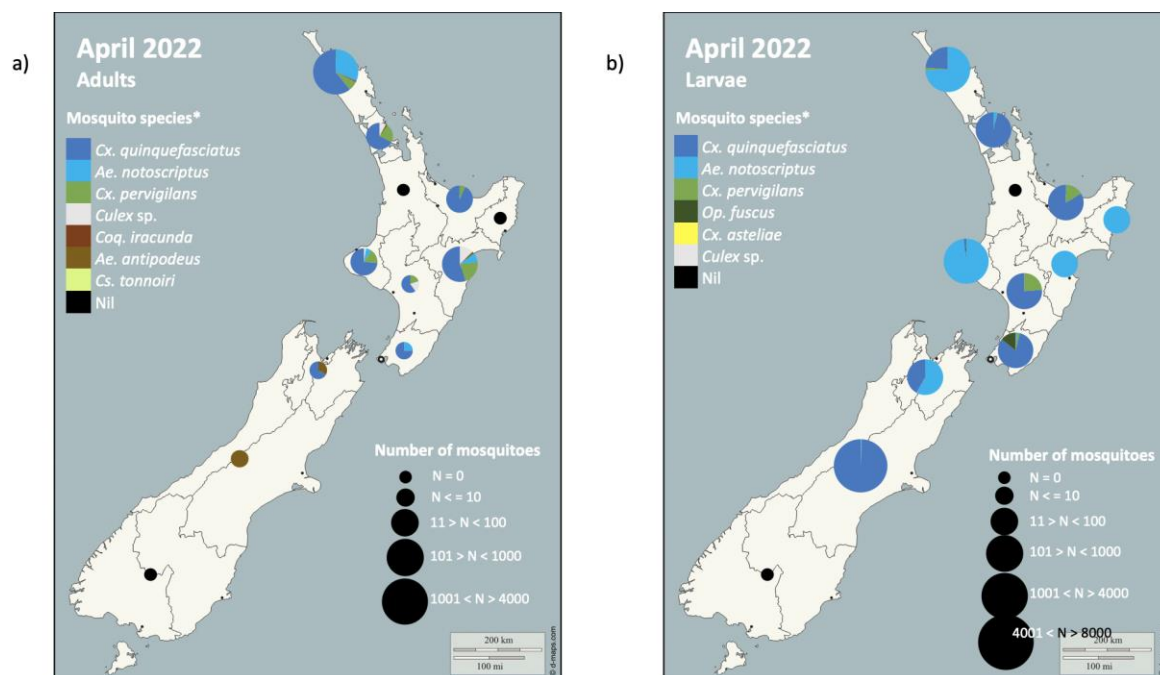


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the April 2022 surveillance period. Please note that the markers represent the DHBs and not the specific sites where the samples have been taken.

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

Compared to this same month last year, mosquito larval and adult numbers have shown an increase (71% and 706% respectively) (Table 1).

Compared to the previous month, the total number of larvae have shown a 39% decrease, while the number of adults has shown a 1% increase.

The highest number of larvae sampled this month was obtained in Community & Public Health with a total of 5782 larvae, followed by Northland DHB with 1836 larvae (Figure 1).

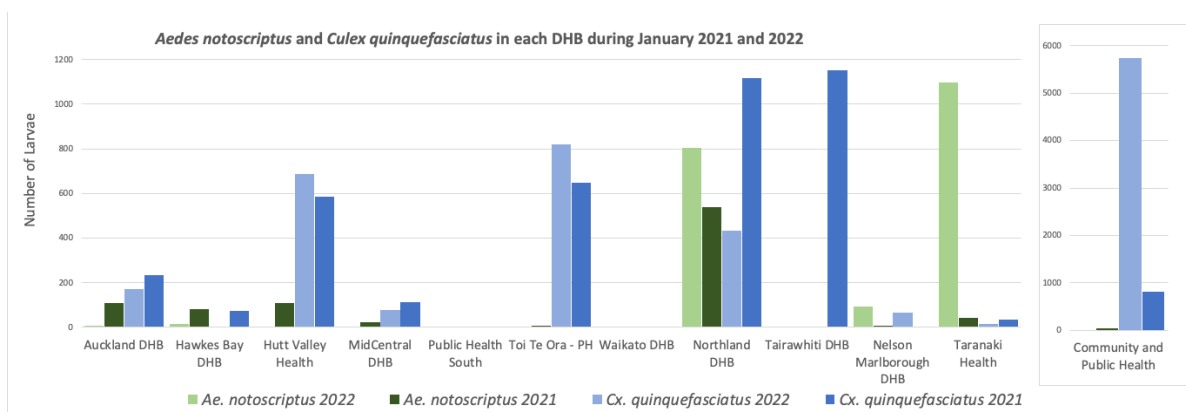


Figure 2. Comparison between introduced mosquito species sampled in each DHB during April 2021 and 2022.

*Please note the different scale for the number of larvae present in Community & Public Health in comparison to the other DHBs.

Aedes notoscriptus larval numbers have shown an increase in three DHBs and a decrease in six DHBs from this same month last year (Figure 2). As expected, *Aedes notoscriptus* has not been recorded this month, this year, or last year in Public Health South (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in four DHBs and a decrease in six DHBs from this same month last year. *Culex quinquefasciatus* has not been recorded this month, this year, or last year in Public Health South (Figure 2).

INCURSIONS AND INTERCEPTIONS

During April, HPOs responded to one suspected interception (Table 2).

Table 2. Suspected interception during April 2022.

Date	Species	Location	Circumstances
08.04.2022	2 female <i>Culex pervigilans</i>	Foodstuffs, 35 Landing drive, Mangere, Auckland	Two live mosquitos were found in a container with packets of rice. The container was from China and the products were from Italy.



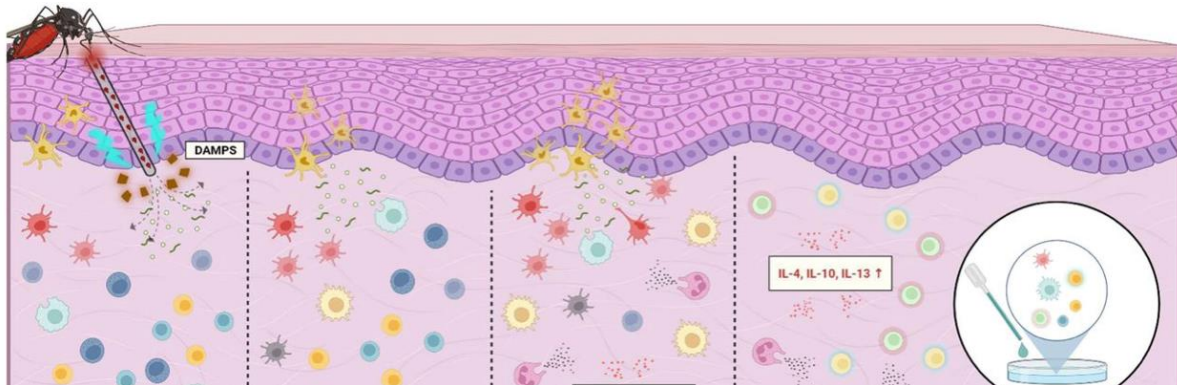
NEWS ARTICLES FROM AROUND THE WORLD

Over 1 million African children protected by first malaria vaccine



More than 1 million children in Ghana, Kenya and Malawi have received one or more doses of the world's first malaria vaccine, thanks to a pilot programme coordinated by WHO. The malaria vaccine pilots, first launched by the Government of Malawi in April 2019, have shown that the RTS,S/AS01 (RTS,S) vaccine is safe and feasible to deliver, and that it substantially reduces deadly severe malaria. [Read more.](#)

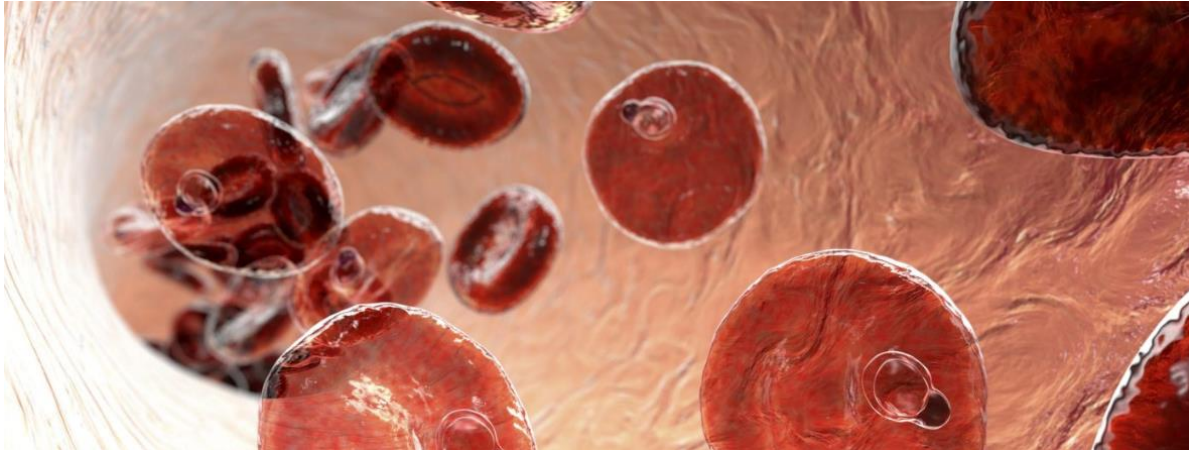
How do mosquito bites affect immunity?



To understand how mosquito-borne viruses initial inoculation occurs in the skin via the mosquito 'bite', eliciting immune responses that shape the establishment of infection and pathogenesis, researchers assessed the cutaneous innate and adaptive immune responses via controlled *Aedes aegypti* feedings in humans living in an *Aedes*-endemic country. [You can read the news article here](#) and the [original paper here](#).

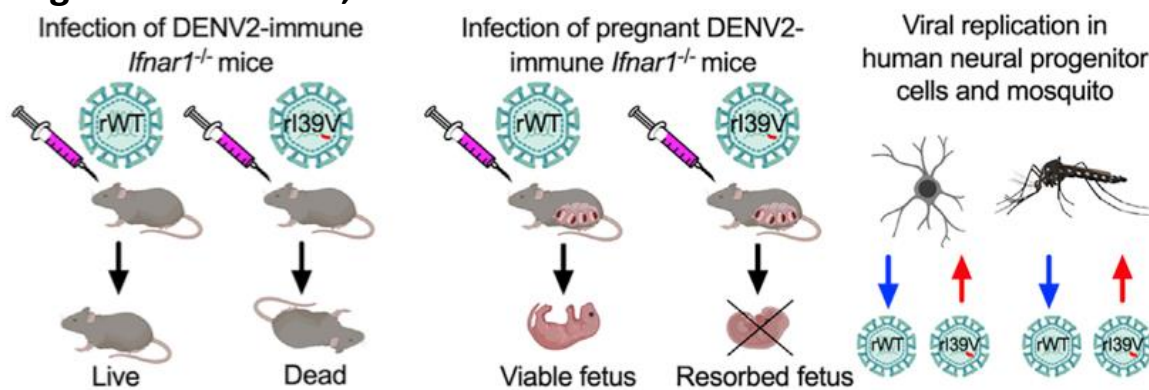


New malaria insights may lead to more effective vaccines



Researchers at Karolinska Institute report they have observed how the immune system acts to protect the body after a malaria infection. Their findings can help in the development of more effective vaccines. [You can read the news article here](#) and the [original article here](#).

Simple Zika virus mutation could evade immunity and spark new dangerous outbreak, scientists warn



A single mutation in the mosquito-borne Zika virus could spark another major outbreak of the disease in humans, scientists have warned. A study of the virus - which can cause severe birth defects and neurological issues - found the mutation makes it more infectious, potentially breaking through pre-existing immunity. [You can read the news article here](#) and the [original article here](#).



Biotech firm announces results from first US trial of genetically modified mosquitoes



The results of the first open air study of genetically engineered mosquitoes in the United States are overall positive, though larger tests are still needed to determine whether the insects can achieve the ultimate goal of suppressing a wild population of potentially virus-carrying mosquitoes. [Read more here.](#)

Nanoparticles prove effective against the yellow fever mosquito



A study from Ohio State University have been testing the use of Carbon black, a type of carbon-based nanoparticles (CNPs), as a larvicide for mosquitoes that have developed a resistance to other chemical insecticides. Using two strains of *Aedes aegypti* mosquitoes, one with insecticide resistance and one without, the researchers looked at the effectiveness of CNPs against the early stages of larvae. They found that while initially the toxicity appeared to be similar in the two groups, the longer the CNPs were suspended in the water, the more toxic they became to the insecticide resistant group, though the reason for this is unclear. [Read more in the news article](#) and [read the original paper here.](#)



CROSSWORD

ACROSS →

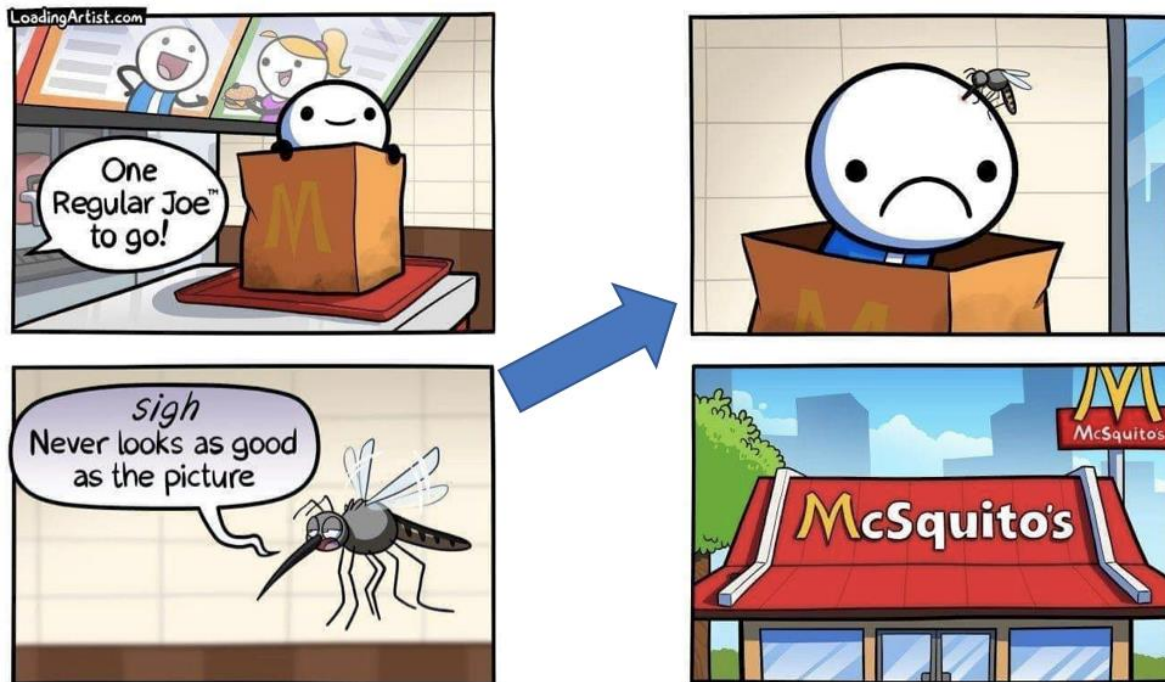
1. Mosquitoes belong to this insect order, which means "two wing" (7).
3. April 25th is observed as World ____ Day (7).
8. Mosquitoes are found in every continent except this one (10).
14. *Culex* ____ is an exotic species thought to have first arrived in the 1830's to NZ (16).
15. Female mosquitoes hunt blood meals by detecting ____ produced by the host (6,7).
16. Larvae develop through four stages - each stage is called an ____ (6).
17. A virus that is transmitted by arthropod vectors is called an ____ (9).

DOWN ↓

2. This attracts container-breeding gravid females and is used to collect mosquito larvae (4,4,).
4. The number of days since a trap was last checked are referred to as the number of ____ (4,6).
5. Male mosquitoes can generally be distinguished from females by their bushier antennae and longer ____ (5).
6. Mosquito larvae breathe through this tubular organ at the end of their body (6).
7. When an exotic mosquito is detected at the border it is an ____ (12).
9. A local species that is not found anywhere else is called an ____ species (7).
10. When an interception has gone undetected, and an exotic population has established it is considered an ____ (9).
11. What does the acronym GAT stand for? (6,5,4).
12. A synthetic insect growth regulator used in tyre traps which prevents adult emergence (1,10).
13. Adult mosquitoes feed using this specialized mouthpart (9).

Illustration source: www.researchmatters.in

A BITE OF HUMOR





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.

[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
