NEW ZEALAND BIOSECURE

# BORDER HEALTH NEWSLETTER – MAY 2022

## NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

Some of you may have already known that Mary Paul is leaving NZBEL. We wish her lots of luck in her new adventure. You will be missed Mary!

This month we also had the pleasure to meet with a fantastic group of HPOs during the Medical Vectors Surveillance Workshop in Christchurch. We hope you enjoyed all the different activities as much as we did!


In the news this month, learn about the discovery that may help create super attractants for mosquitoes. Also, look at the positive results of a trial of a trivalent vaccine against western, eastern and Venezuelan equine encephalitis viruses. Read about a study recording the daily rhythmicity of Anopheles which found out that 30% of the malaria-carrying mosquitoes are biting during the day and indoors. Regarding mosquito control, read about a student that managed to control mosquito larvae by encapsulating essential oils into yeast.

If you are curious to know how you did in the mozzie crossword we featured last month, scroll down and find the right answers and don't forget to check the mozzie picture time exhibition, with some of the photos captured during the Medical Vectors Surveillance Workshop.

Happy reading!

## SURVEILLANCE

During the month of May, 861 routine samples were collected by staff from 12 DHBs (Figure 1). The samples included 94 positive larval samples and 45 positive adult samples, leading to a total of 2,026 adults and 2,602 larvae identified over the past month (Table 1). The dominant larval species this month is *Aedes notoscriptus*, the same as last year (Table 1).

**Table 1**. Number of adult and larvae sampled by the New Zealand surveillance program during May 2021 & 2022

| *Species* (common name) | Adults | | Larvae | |
|---|---|---|---|---|
| | May 22 | May 21 | May 22 | May 21 |
| *Aedes antipodeus* (winter mosquito) | 6 | 4 | - | - |
| *Ae australis* (saltwater mosquito) | 3 | - | 1 | - |
| *Ae notoscriptus* (striped mosquito) | 278 | 83 | 1541 | 1287 |
| *Ae subalbirostris* (no common name) | - | - | - | 2 |
| *Culex* sp. (likely *quinquefasciatus* or *pervigilans*, missing key ID features) | 36 | 25 | - | - |
| *Cx pervigilans* (vigilant mosquito) | 205 | 11 | 137 | 623 |
| *Cx quinquefasciatus* (southern house mosquito) | 1498 | 238 | 902 | 555 |
| *Opifex fuscus* (rock pool mosquito) | - | 1 | 21 | 132 |
| **Total** | **2026** | **362** | **2602** | **2599** |

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

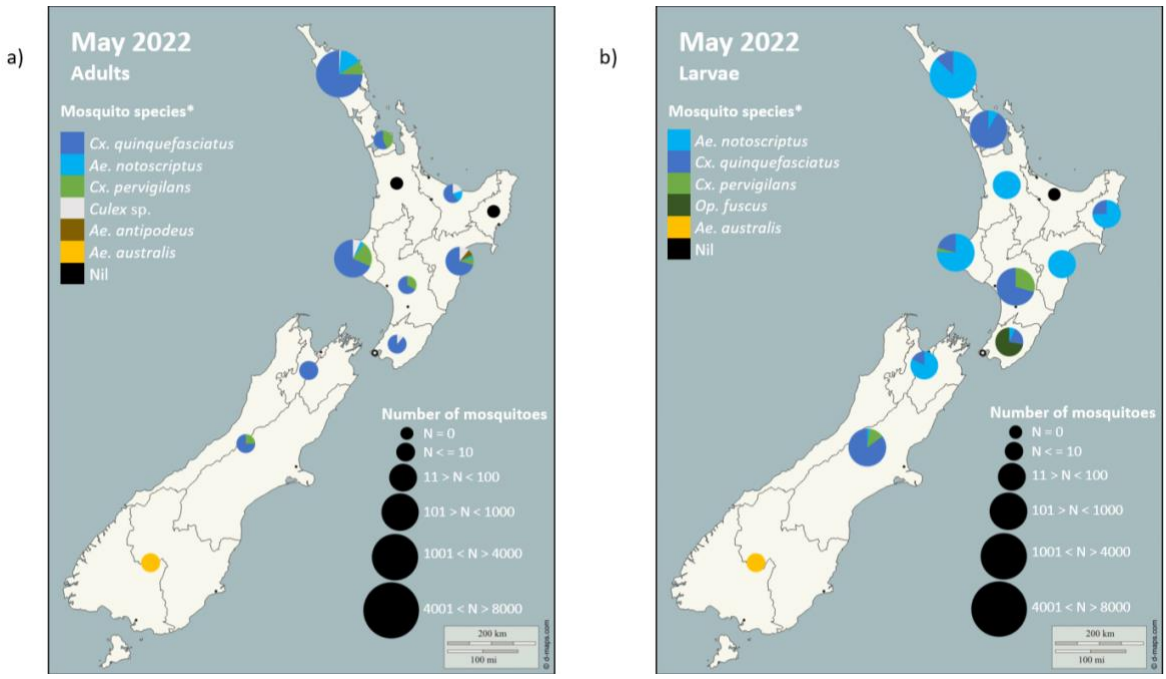



**Figure 1.** Total mosquito adults (a) and larvae (b) sampled in New Zealand during the May 2022 surveillance period. Please note that the markers represent the DHBs and not the specific sites where the samples have been taken.
* The mosquito species are listed in order from the most abundant to the least abundant.

Compared to this same month last year, mosquito larval numbers are similar (0.1% increase) while adult numbers have shown an increase (460%) (Table 1).

Compared to the previous month, the total number of larvae and adults has shown a decrease (77% and 36% respectively).

The highest number of larvae sampled this month was obtained in Northland DHB with a total of 1,036 larvae, followed by Taranaki DHB with 680 larvae (Figure 1).

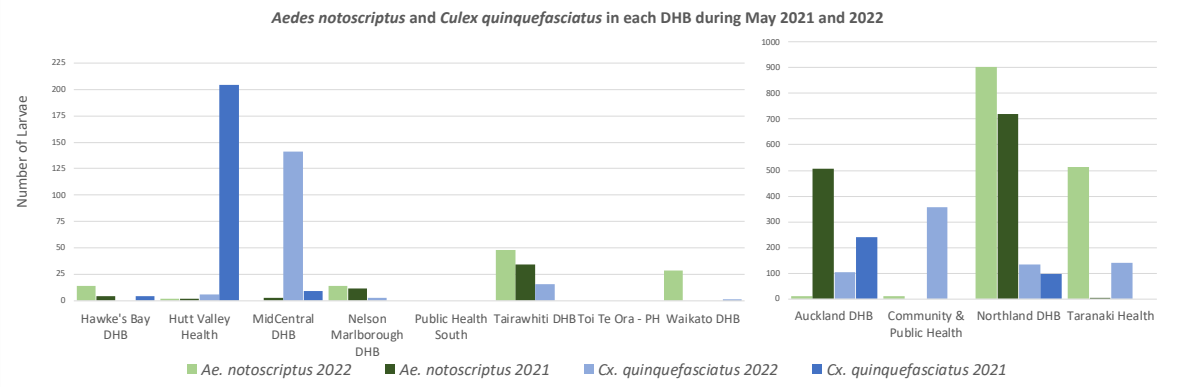



**Figure 2**. Comparison between introduced mosquito species sampled in each DHB during May 2021 and 2022.
*Please note the different scale for the number of larvae present in Auckland DHB, Community & Public Health, Northland DHB, and Taranaki Health in comparison to the other DHBs.

*Aedes notoscriptus* larval numbers have shown an increase in seven DHBs and a decrease in two 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 six DHBs and a decrease in four 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 May, HPOs responded to one suspected interception (Table 2).

Table 2. Suspected interception during May 2022.

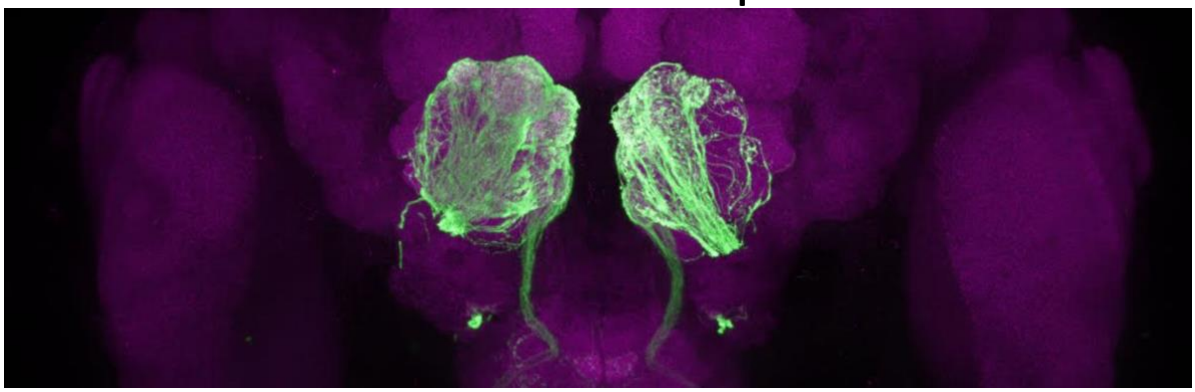
| Date | Species | Location | Circumstances |
|---|---|---|---|
| **17.05.22** | 1 Fungus Gnat | Blue River Dairy Appleby, Invercargill | Found alive while unloading a container of packaging related to infant formula products from China. |

## NEWS ARTICLES FROM AROUND THE WORLD

### Vaccine for rare but deadly mosquito-borne viruses shows promise in clinical trial

A vaccine for eastern equine encephalitis virus (EEEV), western equine encephalitis virus (WEEV), and Venezuelan equine encephalitis virus (VEEV) was found to be safe, well-tolerated and induced a neutralizing antibody response in adult volunteers, according to newly published results from a Phase 1 clinical trial. The vaccine candidate was developed by scientists at the National Institute of Allergy and Infectious Diseases (NIAID) Vaccine Research Center (VRC), part of the National Institutes of Health. Read more. Access original article.

### Researchers Discover What Attracts Mosquitoes to Humans



Two odorants, called decanal and undecanal, are reminiscent of orange peel and are perhaps best known for their use in Chanel No°5 perfume. They are also the compounds that help mosquitoes home in on humans, a new study finds. The research, published on May 4 in Nature, now shows that when female *Aedes aegypti* mosquitoes smell humans, a unique pathway—the "human glomerulus"—activates in their tiny brains. Using CRISPR gene editing, the team generated mosquitoes with olfactory sensory neurons that would fluoresce when activated, allowing them to create imaging of the neurons as the mosquitoes smelled either humans, rats, or sheep. The glomerulus responds particularly to decanal and undecanal, which are volatile components of human sebum, an oily substance produced in the sebaceous glands dotted throughout our skin. Given the choice, the *Aedes aegypti* prefer the smell of humans over other animals. Read more. Access original article.

## This new online tool shows you the local mosquito forecast

Cloudy with a chance of mozzies? In the US if you're planning a barbecue, you can now check the mosquito forecast along with the weather forecast. A new tool predicts local mosquito activity, from "low" ranging up to "severe," for a period of seven days using an algorithm that processes detailed weather data from Google Earth Engine. "The growth of the mosquito, from egg to a biting adult, is really tied to temperature and humidity…" says Jamie Herring, president of Climate Engine, a company that partnered with entomologists at SC Johnson (the makers of Off! brand mosquito repellent) and Google Cloud to build the tool. "So if we can map the actual temperature and humidity changes themselves, we can use that as a proxy for how mosquitoes would develop." They plan to expand the tool to other countries: Brazil and Mexico may be next. Read more. Check out the forecast.

## Nearly a third of bites by malaria-carrying mosquitoes are in the day

Detailed analysis of mosquito bites in the Central African Republic found that, contrary to assumptions, many occur indoors during the daytime when people are not well protected by traditional anti-malaria defences. When Claire Sangbakembi-Ngounou at the Institut Pasteur de Bangui in the Central African Republic noticed that mosquitoes in the capital city appeared to be biting around the clock, she decided to investigate. During her year-long mosquito collection project, Sangbakembi-Ngounou, her colleagues, and her volunteers spent 48 hours every month catching mosquitoes as they landed on a host and started to feed. They discovered that malaria-carrying mosquitoes do up to 30 per cent of their biting indoors during the day. The finding could inform measures to combat malaria, which tend to focus on the insects' night-time feedings. Read more. Access original article.

## Teenager's Science Project Discovery – Finding a Way to Control Mosquitoes Using Essential Oils and Baker's Yeast

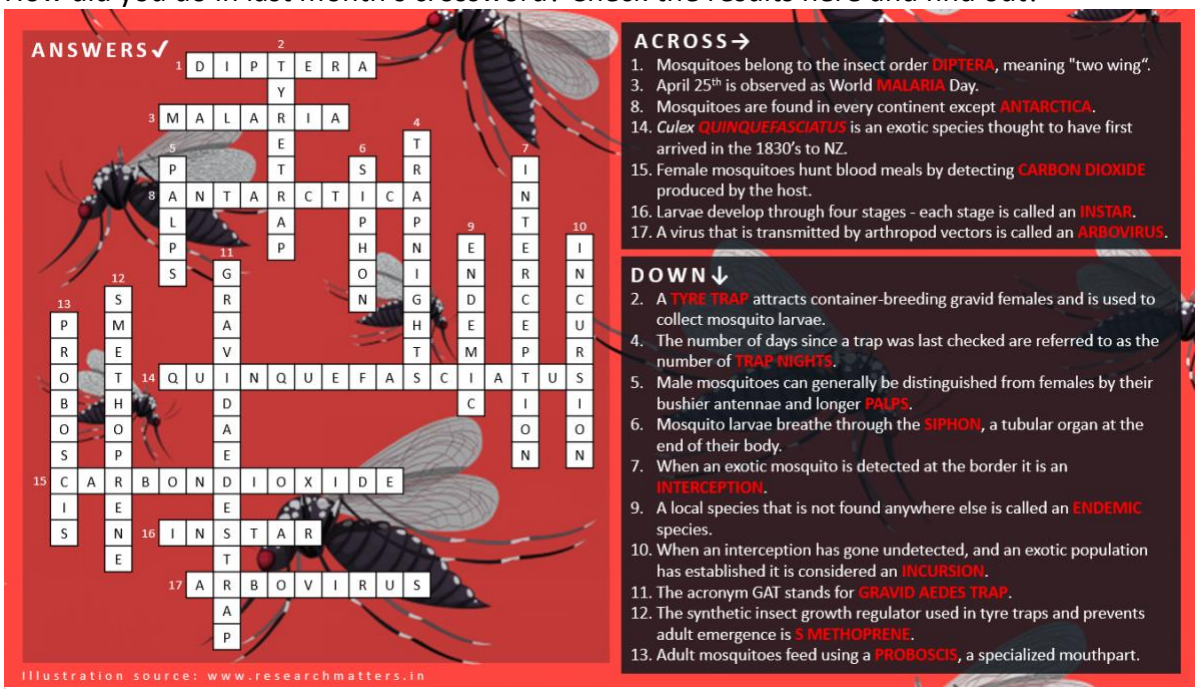

Aseel Rawashdeh's inexpensive larvicide of baker's yeast and essential oils kills disease-spreading species and spares beneficial ones. The student's project won the sixth place in this year's Regeneron Science Talent Search – a prestigious US science and maths competition for promising young scientists in their final year of high school. The 17-year-old tested if *Aedes* mosquito species, known for their transmission of yellow fever, dengue and other viruses, would die after digesting her homemade larvicide, while beneficial mosquito species like *Toxorhynchites rutilus*, which feed on *Aedes* larvae and other insects, would be spared. Rawashdeh's experiment was novel in her method of encapsulating the essential oils into yeast, so that disease-spreading *Aedes* mosquitoes would ingest it while other organisms in the environment would not. While Rawashdeh's larvicide still needs to undergo field studies and further testing on other mosquito species like *Culex* and *Anopheles*, experts think her project has potential. Read more.

## Australia records fifth Japanese encephalitis death

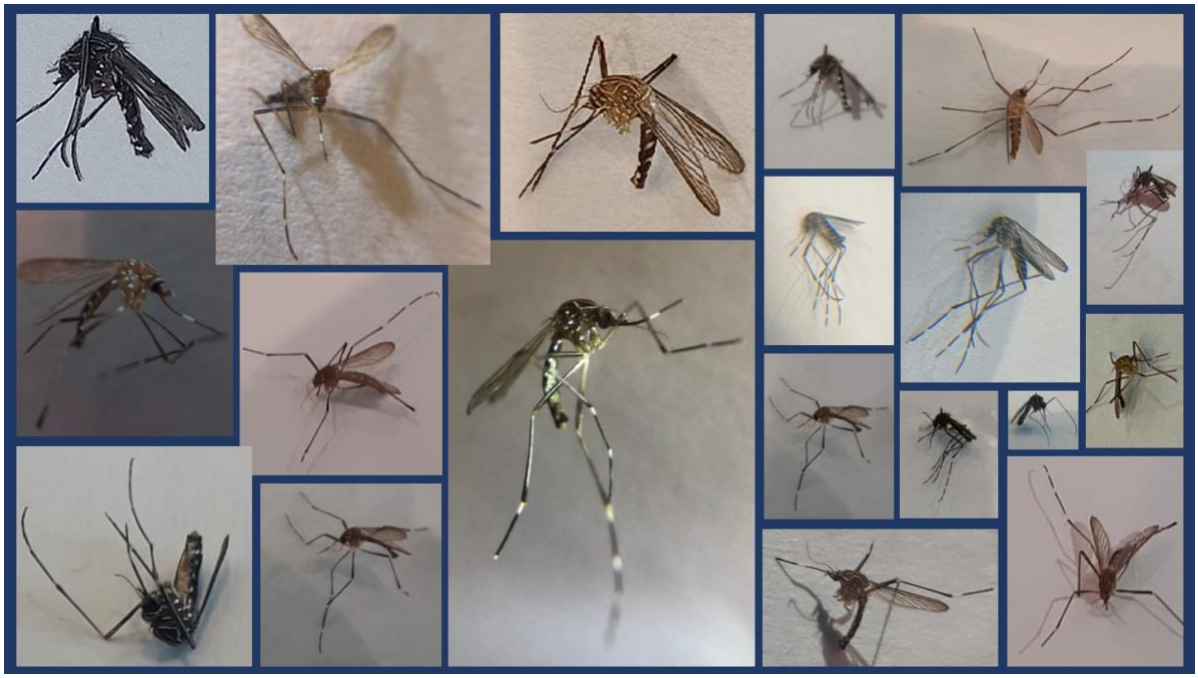
A man in his 60s who was diagnosed with Japanese encephalitis (JE) in early March died at Albury Base Hospital on Friday 20 May, marking the second JE death in the state, NSW Health has confirmed. This brings Australia's death toll from the mosquito-borne virus to five, following the death of another New South Wales man in his 70s in February, and deaths in Victoria, Queensland and South Australia earlier this year. As of 18 May, the Department of Health confirms there are 42 human cases of JE in Australia, with the majority (13) confirmed in New South Wales. Read more.

## CROSSWORD – ANSWERS

How did you do in last month's crossword? Check the results here and find out!




## MOZZIE PHOTO PRACTICE TIME



## 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