



## BORDER HEALTH NEWSLETTER – JULY 2022

### NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

We hope everyone has been keeping warm and dry over the past month! With mozzie numbers declining, this is the perfect time of the year to get your surveillance equipment checked. So, if your regulator and light trap has not been checked this year then now is the perfect moment to contact us and have it done ([taxonomy@nzbiosecure.net.nz](mailto:taxonomy@nzbiosecure.net.nz)).

This month we welcome Lachlan Gilbert to the NZB lab team. Lachlan has been with us for three weeks now and are very happy with his progress!

In the news this month, learn about new advances in the fight against malaria. These include research on kinesins, proteins involved in the malaria parasite cycle, and its importance as potential drug targets and the development of a new way to test malaria vaccines. Also learn about how a mouse model that might revolutionize the development of therapies targeting brain inflammation caused by Rift Valley Fever virus, and about advances in the breeding approach in *Aedes aegypti* to create lines with distinct and stable Wolbachia densities. And finally, read about the three weather variables used to predict mosquito population growth in Sri Lanka.

In The Best Mozzie Picture of the Month section, we have some cool mozzie pictures from Fiji, scroll down and check an exotic black and white striped mosquito. And in the Know Your Mosquito Trap section, learn how to keep your light trap in an ideal working condition.



Happy reading!

## SURVEILLANCE

During the month of July, 701 routine samples were collected by staff from 12 PHUs (Figure 1). The samples included 36 positive larval samples and 13 positive adult samples, leading to a total of 40 adults and 1444 larvae identified over the past month (Table 1). The dominant larval species this month is *Aedes notoscriptus*, the same as last year (Table 1).

Compared to this same month last year, mosquito larval numbers have shown a decrease (9%) while adult numbers have shown an increase (471%) (Table 1).

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

Species (common name)	Adults		Larvae	
	July 22	July 21	July 22	July 21
<i>Ae notoscriptus</i> (striped mosquito)	-	-	1250	1537
<i>Culex</i> sp. (likely <i>quinquefasciatus</i> or <i>pervigilans</i> , missing key ID features)	4	-	-	-
<i>Cx pervigilans</i> (vigilant mosquito)	3	2	71	39
<i>Cx quinquefasciatus</i> (southern house mosquito)	33	5	113	15
<i>Opifex fuscus</i> (rock pool mosquito)	-	-	10	-
<b>Total</b>	<b>40</b>	<b>7</b>	<b>1444</b>	<b>1591</b>

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

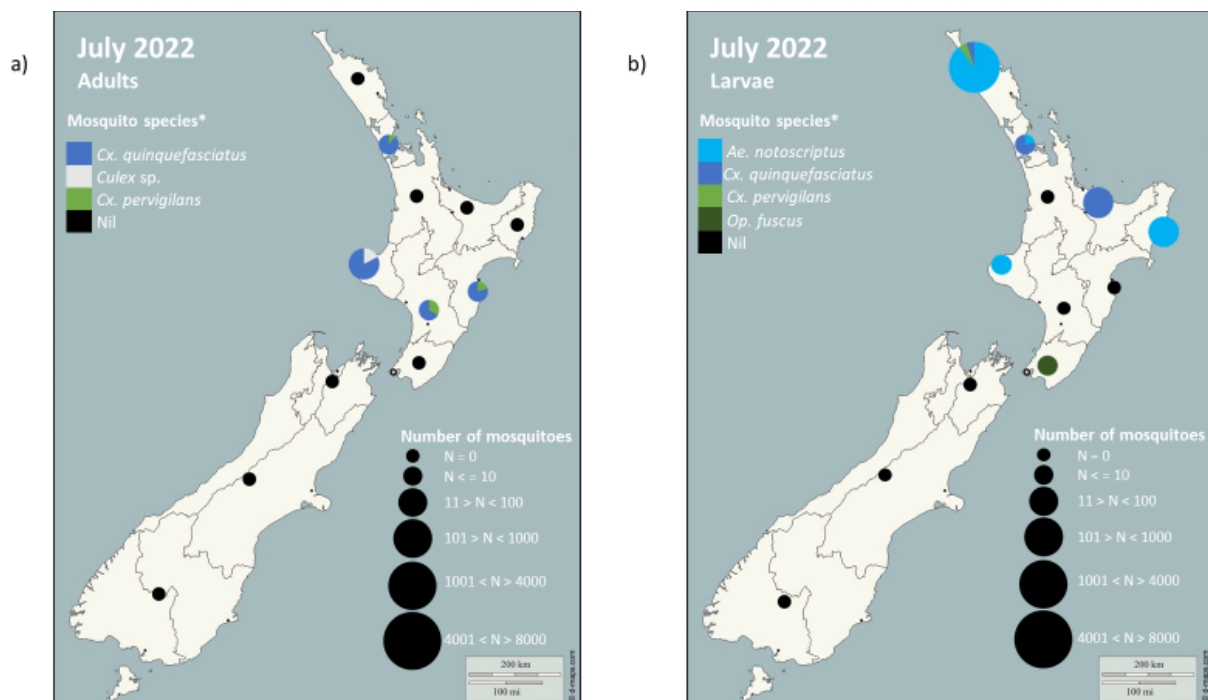


Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the July 2022 surveillance period.

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.

Compared to the previous month, the total number of larvae and adults have shown a decrease (45% and 64% respectively) (Table 1).

The highest number of larvae sampled this month was obtained in Ngā Tai Ora - Public Health Northland with a total of 1317 larvae, followed by Hauora Tairāwhiti with 60 larvae (Figure 1).

*Aedes notoscriptus* larval numbers have shown an increase in two PHUs and a decrease in three 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 Public Health South (Figure 2).

*Culex quinquefasciatus* larval numbers have shown an increase in two PHUs and a decrease in one PHU 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).

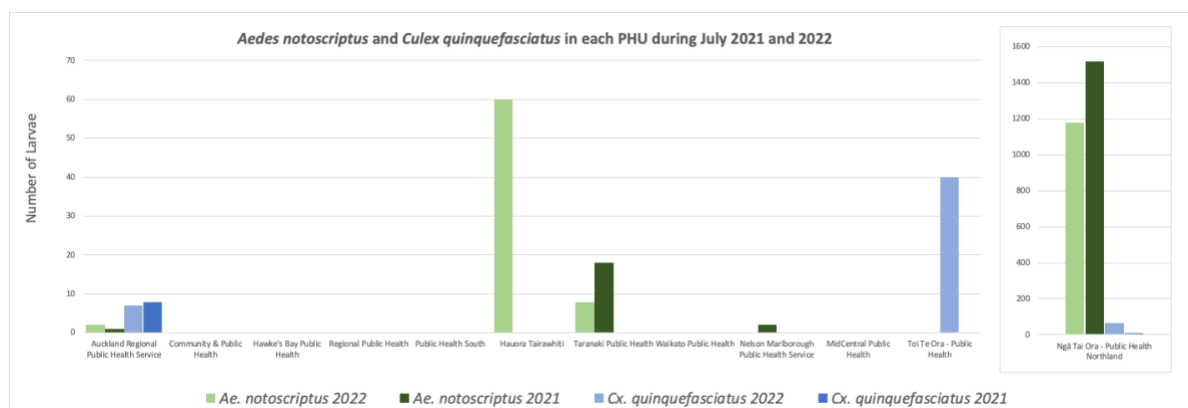


Figure 2. Comparison between introduced mosquito species sampled in each PHU during July 2021 and 2022.

\*Please note the different scale for the number of larvae present in Ngā Tai Ora - Public Health Northland in comparison to the other PHUs.

## INCURSIONS AND INTERCEPTIONS

No interceptions or incursions occurred during the month of July. A new e-DNA sample was collected on Paihia Beach in Northland.

## NEWS ARTICLES FROM AROUND THE WORLD

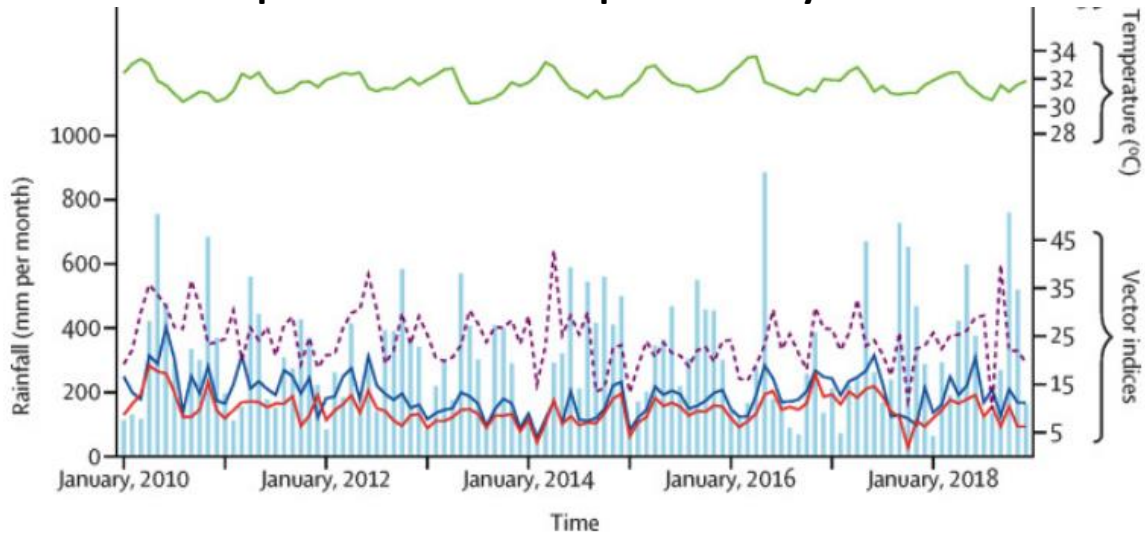
### New way to test vaccines may be as rigorous and stringent as exposure to field strains of malaria

After approving a vaccine that reduces the incidence of malaria infections in young children aged 5-17 months by only 30 percent, the World Health Organisation continues to search for a vaccine that prevents infection as well as cases of severe malaria. Scientists at the University of Maryland School of Medicine's (UMSOM) Institute for Genome Sciences (IGS) and the UMSOM Center for Vaccine Development and Global Health (CVD), and their



collaborators report a new way to test vaccines that may be as rigorous and stringent as exposure to field strains of malaria. [Read more here.](#) [Access the original article.](#)

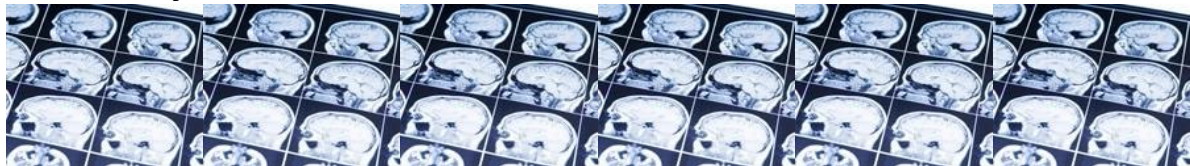
## Climate factors predict future mosquito activity



Dengue, transmitted by *Aedes* mosquitoes, is a major public health problem in Sri Lanka. Weather affects the abundance, feeding patterns, and longevity of *Aedes* vectors and hence the risk of dengue transmission. According to a new study by an international team of researchers, increases in three climate factors - temperature, rainfall, and ocean warming - predicted mosquito population growth in Sri Lanka for the next one to six months. The findings, published in *The Lancet Planetary Health*, can inform the design and timing of programs to limit the spread of mosquito-borne diseases like dengue.

[Read more here.](#) [Access the original article.](#)

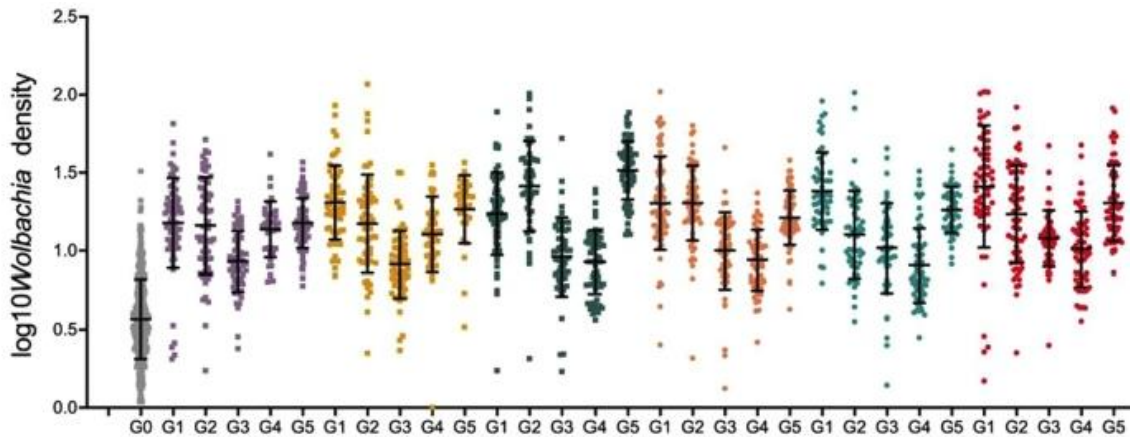
## New mouse model faithfully mimics brain damage caused by severe Rift Valley Fever virus infection



A virus that mosquitoes transmit between animals and people, Rift Valley Fever virus (RVFV) is endemic to the African continent and belongs to a family of viruses identified by the National Institute of Allergy and Infectious Diseases (NIAID) workgroup on pandemic preparedness as likely to give rise to future pandemics. Unlike other mosquito-borne infectious diseases such as malaria, RVFV can be spread by many species of mosquitoes, expanding its potential to sweep across large distances and reach many hosts. A new mouse model identified by virologists from the University of Pittsburgh might revolutionize development of therapies targeting brain inflammation caused by RVFV. [Read more about it here.](#) [Download the original article.](#)

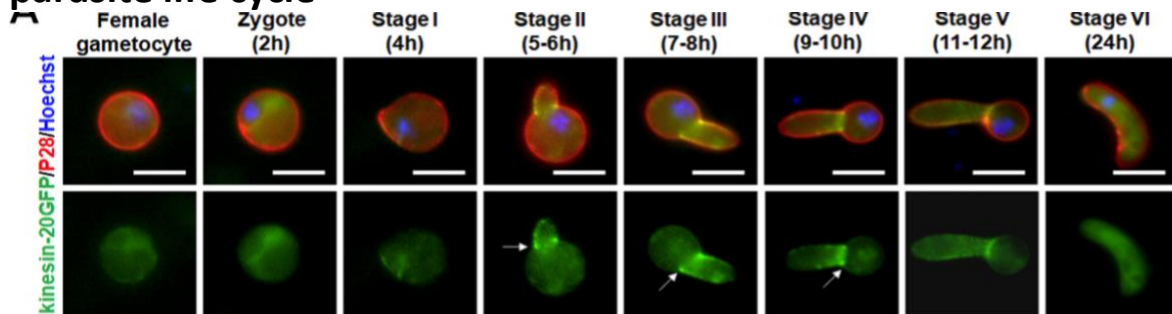


## Attempts to use breeding approaches in *Aedes aegypti* to create lines with distinct and stable relative *Wolbachia* densities



*Wolbachia* is an insect endosymbiont being used for biological control in the mosquito *Aedes aegypti* because it causes cytoplasmic incompatibility (CI) and limits viral replication of dengue, chikungunya, and Zika viruses. While the genetic mechanism of pathogen blocking (PB) is not fully understood, the strength of both CI and PB are positively correlated with *Wolbachia* densities in the host. *Wolbachia* densities are determined by a combination of *Wolbachia* strain and insect genotype, as well as interactions with the environment. This study reveals that there are moderating forces acting on relative *Wolbachia* densities that may help to stabilize density phenotypes post field release. It also shows a means to accurately separate mosquitoes into high and low categories for non-DNA omics-based studies of *Wolbachia*-mediated traits. [Read the original article here.](#)

## Study uncovers the crucial roles of kinesins during the malaria parasite life cycle



Scientists at the University of Nottingham have made a major breakthrough in understanding how malaria parasites divide and transmit the disease, which could be a major step forwards in helping to prevent one of the biggest killer infections in the world. Scientists have uncovered the crucial roles of a group of motor proteins named kinesins during the parasite life cycle. They have studied the location and function of all kinesins in live parasite cells at various stages of development, both in the mosquitoes which transmit the disease, and in



the host where it causes disease. These proteins are important potential drug targets, hence the importance of this study in the search for new intervention targets. [Read more. Access the original article.](#)

## KNOW YOUR MOSQUITO TRAP



### How to Care for your Light Trap!



- Ensuring that your light trap is clean will keep it in good working order and will ensure that specimens caught aren't damaged or dirty
- The white funnel and fan should be cleaned with a toothbrush to ensure that it doesn't get too dusty when the trap is checked
  - Disconnect the battery first and be gentle!
- The catch cup and stocking should be rinsed to ensure remove any dirt or dust
  - Check that there are no mosquitoes before rinsing the cup and stocking!
- Avoid using strong scented soaps or cleaning agents as they may act as a repellent to mosquitoes and decrease efficiency of the trap
- If the trap or catch cup is going into storage, ensure that it is clean and there are no mosquitoes/insects caught anywhere in the cup. This could muddle results when the cup is returned to use!
- Light traps and regulators should be sent to the Lab over the winter months for maintenance

## THE BEST MOZZIE PHOTO OF THE MONTH

**Photographer:** Debe Anderson - Health Protection Technical Officer, ECE Coordinator, Biosecurity Ngā Tai Ora – Public Health Unit / Te Tai Tokerau / Northern Region

Sample collected in Fiji - ID from photos: Female likely *Aedes albopictus*



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## 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

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