NEW ZEALAND BIOSECURE

# BORDER HEALTH NEWSLETTER – SEPTEMBER 2021

## WELCOME!

Kia Ora Koutou,

As you may already know the Pest and Vector course that was to be held this October in Auckland has been postponed. We hope that we can get safely together soon. Talking about Auckland, we congratulate Auckland International Airport for being nominated for the Biosecurity Award 2021, under the category GIA Industry Award!

In the news this month read about; the first vaccine against malaria to get approval by the World Health Organization, the discovery of the mechanism used by the Rift River virus to penetrate mammal cells also unlocking a pathway to develop a treatment in the near future, how scientists managed to introduce a gene in *Culex quinquefasciatus* opening the doors to the use of this technique for future control. And about a behavioural study that shows that male mosquitoes are also attracted to humans, not to take blood, but to find females. Lastly closer to home, learn how after successfully controlling *Aedes aegypti* with Wolbachia, the Aussies want to use the bacterium to control *Aedes albopictus* in the Torres Strait.

Also, don't forget to scroll down and check the new section Buzzing Around, this month presenting a snapshot of the delimiting survey conducted by MidCentral Health Protection Officers in Palmerston North. In addition, check out the Know Your Mosquito section to learn about *Aedes vexans* also known as the inland flood -water mosquito. Also, see how you did and check the answers for the Mosquito Word Search we published last month and have a laugh with the Bite of Humour sections.

Happy reading!

## SURVEILLANCE

During September, 832 samples were collected by staff from 10 DHBs (Figure 1). The samples included 48 positive larval samples and 4 positive adult samples, leading to a total of 6 adults and 1683 larvae identified over the past month (Table 1). As is common over the cooler months, *Aedes notoscriptus* is the dominant larval species (Table 1).

In total, four mosquito species have been collected this month (Table 1), the same number of species collected last month.

Compared to this same month last year, the total number of larvae and adults have shown a 15% decrease and a 50% increase respectively (Table 1).

**Table 1**. Adult and larvae sampled by the New Zealand surveillance program during September 2020 & 2021

| *Species* (common name) | Adults | | Larvae | |
|---|---|---|---|---|
| | Sep 21 | Sep 20 | Sep 21 | Sep 20 |
| *Ae antipodeus* (winter mosquito) | - | 2 | - | - |
| *Ae notoscriptus* (striped mosquito) | - | - | 1474 | 1636 |
| *Cx pervigilans* (vigilant mosquito) | 2 | - | 188 | 271 |
| *Cx quinquefasciatus* (southern house mosquito) | 3 | 2 | 12 | 63 |
| *Culex* sp. | 1 | - | - | - |
| *Opifex fuscus* (rock pool mosquito) | - | - | 9 | 16 |
| **Total** | **6** | **4** | **1683** | **1986** |

Compared to last month, mosquito larval and adult numbers have shown a 142% and 50% increase respectively.

The highest number of larvae sampled this month was obtained in Northland DHB (1249 larvae) followed Hawke's Bay (276 larvae) (Figure 1).

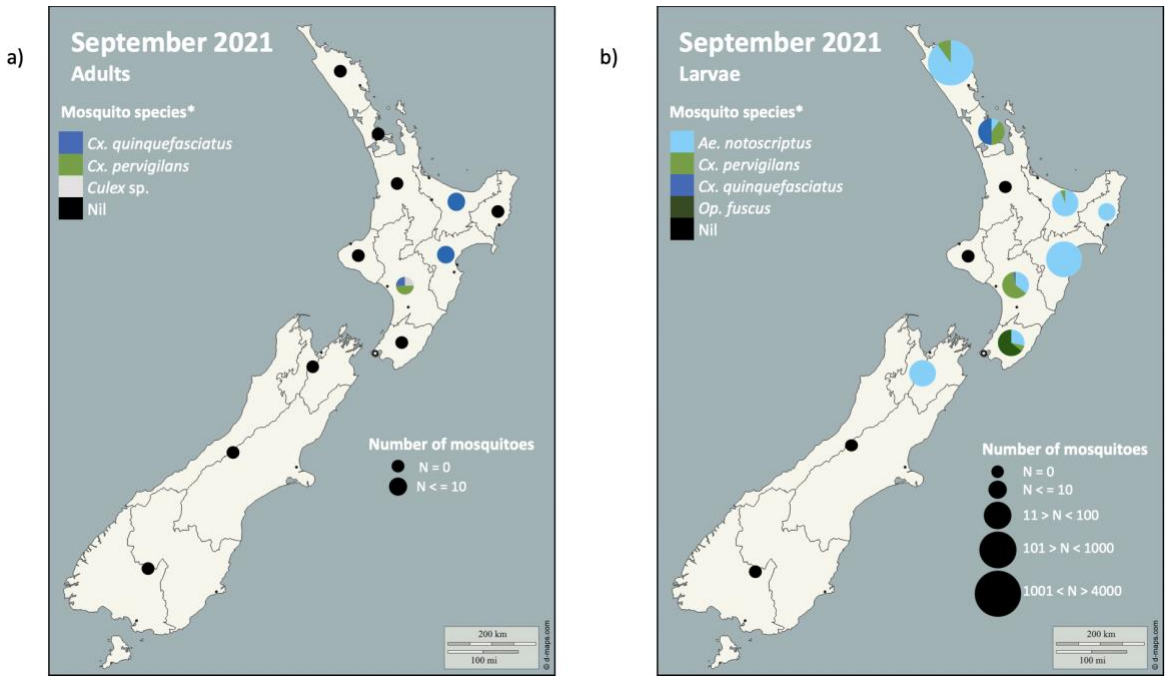



**Figure 1.** Total mosquito adults (a) and larvae (b) sampled in New Zealand during the September 2021 surveillance period. Please note that the markers represent the DHBs and not the specific sites where the samples have been taken.
* The mosquito species are listed in order from the most abundant to the least abundant.

*Aedes notoscriptus* larval numbers have shown a decrease in 5 DHBs from this same month last year, and an increase in 4 DHBs (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 a decrease in two DHBs from this same month last year, and an increase in two DHBs. *Culex quinquefasciatus* has not been found this month in Public Health South (Figure 2).

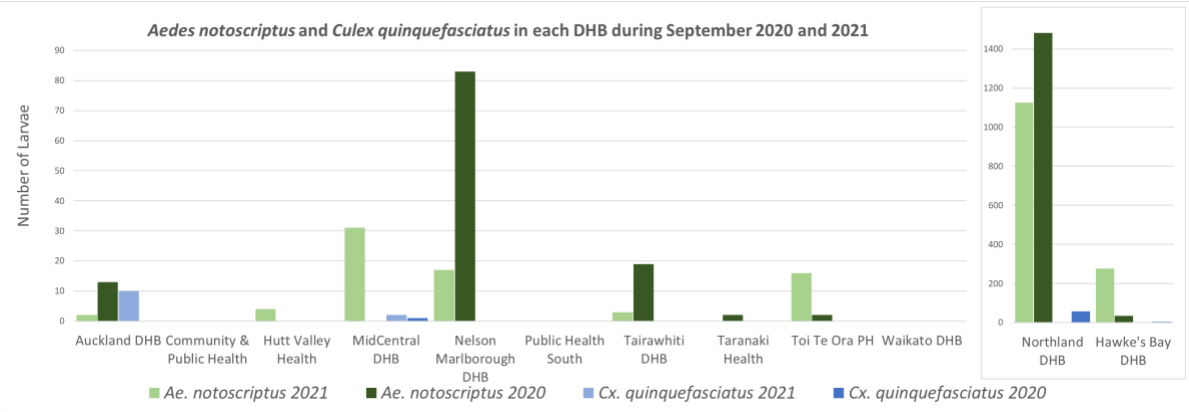



**Figure 2**. Comparison between introduced mosquito species sampled in each DHB during September 2020 and 2021. *Please note the different scale for the number of larvae present in Northland DHB and Hawke's Bay DHB in comparison to the other DHBs.

*Disclaimer: Note that all comparisons made have not been statistically tested and can be due to sampling effort.*

## INCURSIONS AND INTERCEPTIONS

During September, HPOs responded to four suspected interceptions including one event where exotic mosquitoes were identified (Table 2 - exotic mosquito species shown highlighted in blue). A delimiting survey was carried out by MidCentral DBH after a suspected interception where two live insects were seen flying in a container but were unable to be collected. No exotic mosquitoes were found during the delimiting survey.

Table 2. Suspected interceptions during September 2021.

| Date | Species | Location | Circumstances |
|---|---|---|---|
| **08.09.2021** | 1 non-mosquito *(Chironomidae)* | The Warehouse South Island Distribution Centre, 12-36 Izone Drive, Rolleston | Found alive in a container of goods for The Warehouse during devanning. |
| **14.09.2021** | 1 Female *Culex (Culex)* sp.<br>2 Female *Aedes vexans*<br>1 non-mosquito (fly) | Gisborne Port, on board logging vessel | Found dead immersed in a sticky substance in the ship's hold during a ship sanitation inspection of a logging vessel originating from Caofeidian, China. |
| **15.09.2021** | No sample | Steelfort Engineering Company, 500 Rangitikei Street, Palmerston North | Two live insects suspected to be mosquitoes were seen while devanning a container of boxed lawnmowers. The insects were sprayed along with the container, but the container doors remained open and the specimens were unable to be collected. |
| **20.09.2021** | 1 non-mosquito (*Piophilidae* fly) | Steelfort Engineering Company, 500 Rangitikei Street, Palmerston North | Dead insect found in a second container at Steelfort associated with the suspected interception on 15.09.2021. |

## NEWS ARTICLES FROM AROUND THE WORLD

### Historic RTS,S/AS01 recommendation can reinvigorate the fight against malaria


The world's first malaria vaccine should be given to children across Africa, the World Health Organization has recommended, in a move that officials hope will spur stalled efforts to curb the spread of the parasitic disease. WHO director-general Tedros Adhanom Ghebreyesus called it "a historic moment" after a meeting in which two of the UN health agency's expert advisory groups endorsed using the vaccine. Read more.

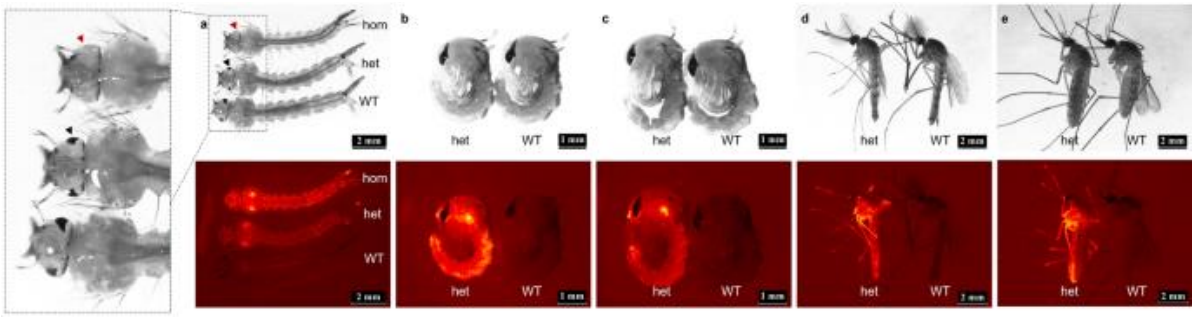
### Male mosquitoes don't want your blood, but they still find you very attractive

When it comes to being bugged by mosquitoes, most people know that the females are the ones doing the biting and that males tend to leave you alone. However, researchers from Australia have shown that while male mosquitoes won't bite you, they may not leave you alone either. The researchers had volunteers acting as bait in a semi-field setup that was mimicking a backyard and released male *Aedes aegypti* mosquitoes and recorded whether they were attracted to the volunteers or not. They found that up to 20% of the males released were swarming within view of the camera they had set up for observation. They suggest that further work does need to be done on the longer range attraction of male mosquitoes to humans and that it may be beneficial as many control techniques are focused on male mosquitoes. Read more. Original paper.

## Natural bacteria could wipe out dengue-carrying mosquitoes, Australian research suggests

Results from a trial in three communities in northern Queensland, Australia has shown that populations of *Aedes aegypti* have successfully been controlled with a population drop of over 80% following the release of 3 million *Wolbachia* infected male mosquitoes. The team hopes to use a similar technique on populations of *Aedes albopictus* which has established in the Torres Strait. Read more. Access original article.

## Scientists use gene editing tool to target mosquito-spread disease (*Culex quinquefasciatus*)




*Culex quinquefasciatus* or The Southern House Mosquito is a widespread species which occurs throughout the world, including New Zealand. Overseas this species transmits a variety of arboviruses, such as West Nile virus, and other diseases such as lymphatic filariasis. Currently control strategies are reliant on insecticides, with much of the genetic based control work focusing on *Aedes* and *Anopheles* species. This study by researchers at the Pirbright Institute successfully used CRISPR/Cas9, a gene editing tool, to introduce a fluorescent protein to the genome, and proved that this technology can be used to target this species. Read more. Original article.

## Deadly virus's pathway to infect cells identified

Rift Valley fever has been listed by The World Health Organisation as a disease that is likely to cause epidemics in the future. It is limited to Africa and the Arabian Peninsula, however vectors for the virus are found worldwide and there is currently no specific treatment available. A recently published study by researchers at Washington University

School of Medicine in St. Louis and the University of Pittsburgh Center for Vaccine Research and School of Public Health found the mechanism that the virus enters the cells, through a receptor for cholesterol. While this protein is an important part of many biological processes, decreasing its usefulness for drug development, knowing this pathway may help to develop a treatment. Read more. Original article

## Auckland Airport finalist in the Biosecurity awards 2021


Auckland Airport has elevated biosecurity from being something that border control staff do in the passenger arrivals area to something the whole airport community understands and is involved with. In doing so, the company has created a team of biosecurity champions among its own workers as well as the staff of airlines, ground handlers, tenants and border agencies at the Airport. Read more.

## A BITE OF HUMOUR

**Mosquito trap**

The mosquito lands on the salt, thinking it's sugar. They get thirsty for water, but the cap has rum in it.
The mosquito gets drunk, trips on the stick and bangs its head on the rock.

# KNOW YOUR MOSQUITO

## AEDES VEXANS
### THE INLAND FLOOD-WATER MOSQUITO

One of the most widely distributed floodwater mosquitoes in the world - collected on every continent except Antarctica and South America.

"Floodwater" species - lay eggs individually on moist soil above waterline in temporary pools or permanent water bodies. Eggs can remain dormant for years waiting for water level to rise before hatching.

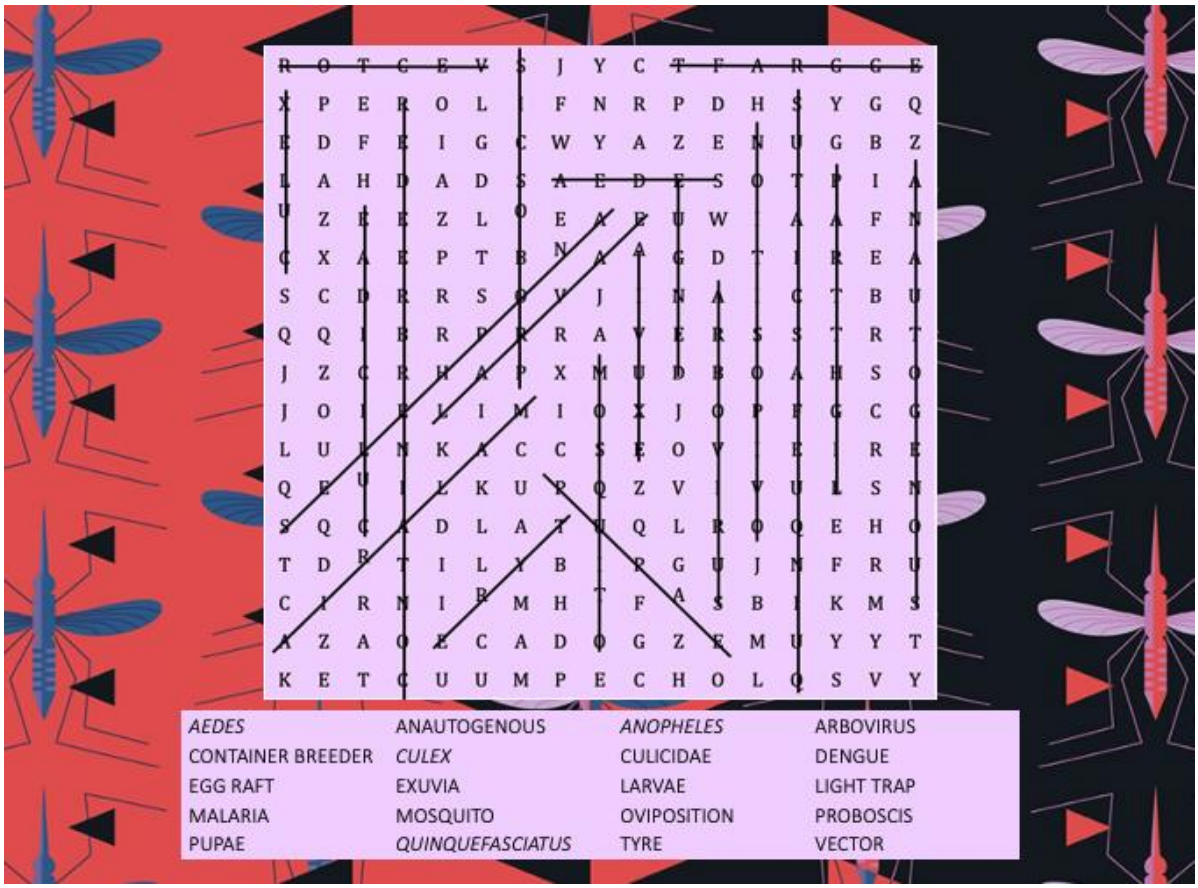
Strong fliers – can be found up to 24km away from hatch sites.

Name "*vexans*" is from the Latin "*vexāre*" - to annoy, torment, or harass. Adult females are aggressive and opportunistic evening biters.

Vector of several diseases - including West Nile Virus, Rift Valley fever, and dog heartworm.

Intercepted 7 times in NZ since 2010 - most recently in Sept 2021 on a ship originating from China.

# MOSQUITO WORD SEARCH ANSWERS



## BUZZING AROUND

This month, Carolyn and Mary from the NZB lab had fun assisting MidCentral HPOs Susan, Kathryn, Andrew and Karen with a delimiting survey after a suspected interception at Steelfort Engineering in Palmerston North.

## 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