NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER - JANUARY 2018

WELCOME!

Kia Ora Koutou,

This January has broken all the climatic records in New Zealand, with the hottest month on record. This year January has also been the mozziest January registered in the past years (Figure 3). However, it has not been the most numerous month in record, have a look to the last year chart in the December 2017 Border Health Newsletter, and check the larval numbers for March for an example.

We would like to thanks Peter Haslemore for sampling some *Maorigoeldia argyropus* for the lab!

In the news, scientists are doing their best to try to stop mosquitos from transmitting disease and to anticipate how global change will affect the spread of this vector-borne diseases.

Do not forget to visit our direct access to risk maps and diseases outbreaks. This month we have a new addition from the Institute of Environmental Science and Research (ESR) - Information for New Zealand Public Health Action Public Health Surveillance.

SURVEILLANCE

During January 1414 samples were collected by staff from 11 DHBs with 406 positive samples. This included 115 adult samples and 291 larval samples, leading to a total of 5134 adults and 17801 larvae identified over the past month (Table 1).

Table 1. Adult and larvae numbers found by the New Zealand surveillance program during January of last year and this year.

Species (common name)	Adults		Larvae	
	Jan. 18	Jan. 17	Jan. 18	Jan. 17
Aedes notoscriptus (striped mosquito)	2434	579	2509	962
Ae. antipodeus (winter mosquito)	18	2	0	0
Ae. australis (saltwater mosquito)	0	0	0	5
Ae. sualbirostris	0	0	1	0
Coquillettidia iracunda	84	84	0	0
Coq. tenuipalpis	2	0	0	0
Culex pervigilans (vigilant mosquito)	667	38	4959	2719
Cx. quinquefasciatus (southern house mosquito)	1927	845	10313	4267
Culiseta tonnoiri	1	0	0	0
Opifex fuscus (rockpool mosquito)	1	1	19	70
Total	**5134**	**1549**	**17801**	**8023**

Compared to this same month last year, both adult and larvae numbers have shown a significant increase (231% and 122% respectively, Table 1).

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In total 9 mosquito species have been found this month, that is one more than last month. Northland DHB was the most specious DHB this month with 8 mosquito species (two more than last month), followed by the rest of DHBs with 3 species and Public Health South with 2 (Figure 1).

Toi Te Ora - PH is the DHB with the highest numbers of larvae (4493, almost double than last month) followed by Public Health South (2376, almost double than last month) and MidCentral DHB (1992). Northland is the DHB with the highest numbers adults (2761, more than five times than last month) followed by Auckland DHB (1880; Figure 1).

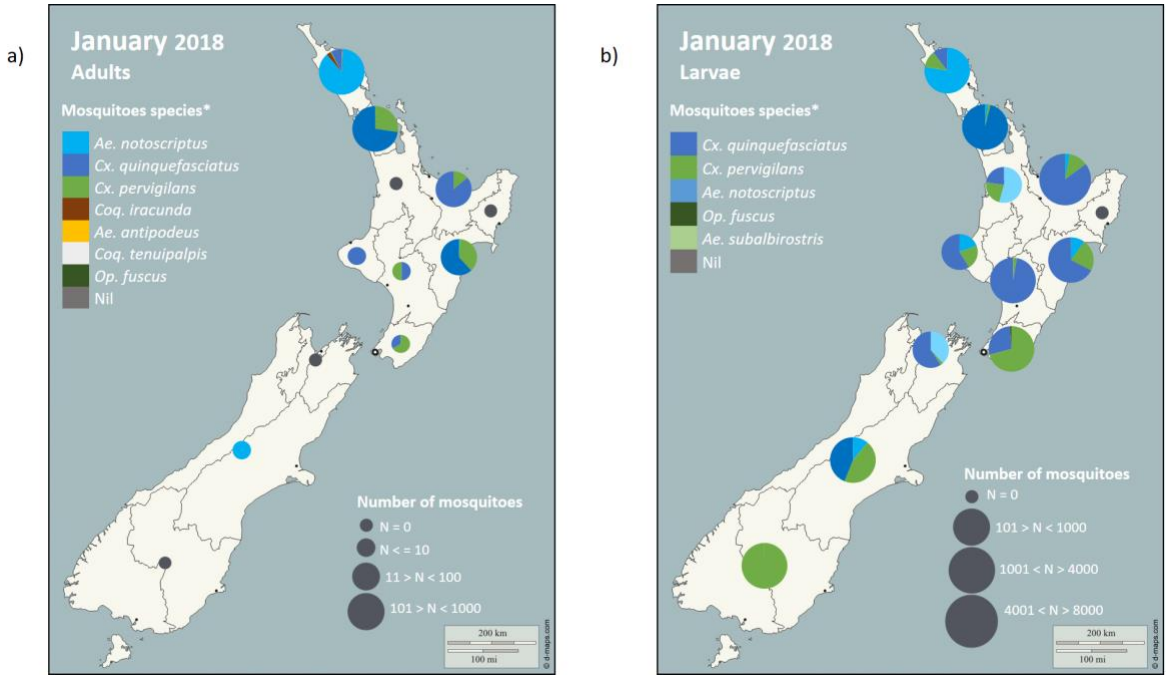

Figure 1. Mosquitoes adults (a) and larvae (b) sampled in New Zealand during the January 2018 surveillance period.
* The mosquito species are listed in order from the most numerous to the least numerous.
Please note that the markers represent the DHBs and not the specific sites where the samples have been taken.

The introduced species for January are represented by *Aedes notosciptus* and *Culex quinquefasciatus.* Nil *Ae. australis* have been found this month in contrast with this same month last year (Table 1, Figure 1).

As expected *Ae. notoscriptus* and *Culex quinquefasciatus* have not been recorded this month, this year and last year in Public Health South, with routine sampling showing that it has not yet established populations in this area (Figure 2).

Larvae numbers for the most representative introduced mosquitoes *Aedes notoscriptus* and *Culex quinquefasciatus*, have shown a significant increase this month compared to the same month last year (149% and 139% respectively) (Table 1).

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Aedes notoscriptus larval numbers have shown an increase in 8 DHBs from this same month last year (Auckland, Community and Public Health, Hawkes Bay, Nelson Marlborough, Northland, Toi Te Ora - PH and Waikato), and shown a decrease in Taranaki Health (Figure 2). In comparison with this same month last year, *Ae. notoscriptus* was not detected in Hutt Valley Health and it was now detected in MIdCentral DHB (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in 7 DHBs from this same month last year (Auckland, MidCentral, Nelson Marlborough, Waikato, Community and Public Health, Hawkes Bay and Toi Te Ora - PH), and shown a decrease Northland, Figure 2). *Cx. quinquefasciatus* was not detected in Taranaki Heath this month in comparison with this same month last year, and is now present in Hutt Valley Health (Figure 2).

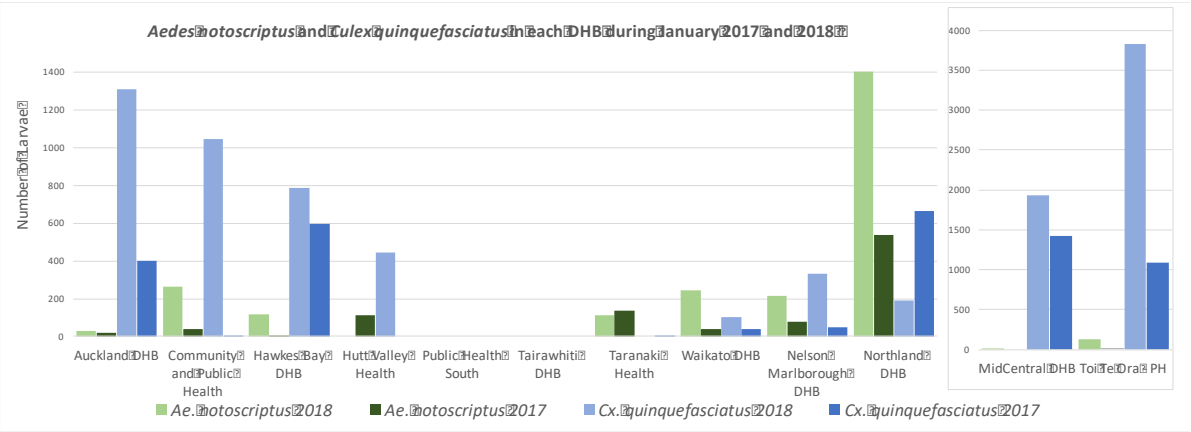

Figure 2. Comparison between introduced mosquitoes sampled in each DHB New Zealand during January 2017 and January 2018.

* Please note the different scale for the number of larvae present in MidCentral DHB and Toi Te Ora – PH in comparison to the other DHBs.

INCURSIONS AND INTERCEPTIONS

During January, 8 suspected interceptions have been recorded (Table 2). Not unwanted or exotic species have been intercepted this month.

Table 2. Suspected interceptions during January 2018

Date	Species	Location	Circumstances
04.01.2018	1 Female *Culex pervigilans*	ITB Auckland International Airport	Found alive by MPI in X-ray machine
16.01.2018	1 Male *Culex quinquefasciatus*	ITB Auckland International Airport	Found dead in cargo carrying flowers from Malaysia
16.01.2018	1 Female *Culex quinquefasciatus*	ITB Auckland International Airport	Found alive at MPI Team Leader's office
19.01.2018	1 Female *Culex quinquefasciatus*	ITB Auckland International Airport	Found alive by MPI officer at green lane exit
20.01.2018	1 Male *Culex quinquefasciatus*	ITB Auckland International Airport	Found alive by MPI at DDP station
28.01.2018	1 Male *Culex quinquefasciatus*	ITB Auckland International Airport	Found alive at Clearance area
31.01.2018	1 Female *Culex* sp.	ITB Auckland International Airport	Found alive next to X-ray machine

NEWS ARTICLES FROM AROUND THE WORLD

New project to study effect of climate change on society's vulnerability to dengue fever

New research project will study how changes and variations in climate affect a society's vulnerability and risk of mosquito-transmitted diseases, particularly dengue fever, in Southeast Asia. Dengue fever is the most rapidly spreading mosquito-transmitted viral disease in the world. It causes roughly 390 million infections and 22,000 deaths annually. There is currently no cure and a recently licensed vaccine does not give complete protection. Read more here. or here

High-tech tools could help in fight against dengue

Dr Michael Callahan from the Zika foundation.

Some Pacific nations have been briefed on innovative tools they could use to try to combat mosquito-borne illnesses. A recent TechCamp conference in Auckland brought together a variety of stakeholders to discuss new technology, from a NASA-developed GLOBE APP that can see minute details of any mosquito, to a drone that can assist with mapping. Read more.

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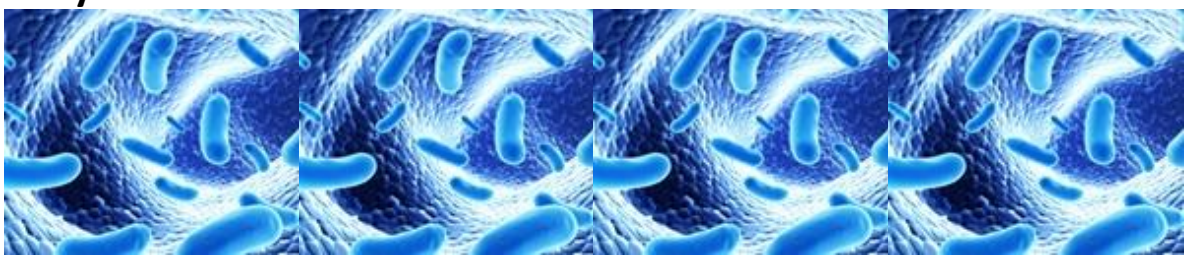
Mosquitoes can rapidly learn and remember the smell of hosts, study shows

The study, published Jan. 25 in the journal *Current Biology*, shows that mosquitoes can rapidly learn and remember the smells of hosts and that dopamine is a key mediator of this process. Mosquitoes use this information and incorporate it with other stimuli to develop preferences for a particular vertebrate host species, and, within that population, certain individuals. Read more.

Scientists methodically identify genes related to blood feeding and non-biting mosquitoes

Researchers have taken the first step on a path that eventually could result in female mosquitoes that no longer bite and spread diseases. A group of scientists at the University of Birmingham, University of Oregon, Oregon Health and Science University, University of Notre Dame, and The Ohio State University methodically identified 902 genes related to blood feeding and 478 genes linked to non-blood feeding from the mosquito *Wyeomyia smithii*. Read more.

Study reveals how dengue virus replicates without triggering the body's defences



A new study reveals how dengue virus manages to reproduce itself in an infected person without triggering the body's normal defenses. Duke researchers report that dengue pulls off this hoax by co-opting a specialized structure within host cells for its own purposes, like a lazy roommate sneaking bits of his laundry into the communal wash. Read more.

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Genetic changes help mosquitoes to develop pesticide resistance

The fascinating array of genetic changes that confer pesticide resistance in Anopheles mosquitoes is reviewed in an article published today in Trends in Parasitology. The paper is written by Colince Kamdem, a postdoctoral scholar, and two colleagues from the Department of Entomology at the University of California, Riverside. The findings highlight the interplay between human interventions, mosquito evolution, and disease outcomes, and will help scientists develop new strategies to overcome pesticide resistance. Read more.

THE BEST INTERCEPTION MOZZIE PICTURE OF THE MONTH

Female *Culex quinquefasciatus*

About the photographer:
Brett Thompson is a Health Protection/Technical Officer working in the Auckland Regional Public Health Service

Characteristics of a good Mozzie picture:
- Picture is in focus
- The light allows the viewer to interpret the different colours.
- All body parts are distinguishable.

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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. Choose a country to display the current distribution of Malaria.

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).

World Health Organization – World Health Organization.

Public Health Surveillance - Institute of Environmental Science and Research (ESR) - Information for New Zealand Public Health Action.

MOZZIE NUMBERS OF THE PAST JANUARYS

The mosquito numbers registered this January is higher than past year's Januarys. The increases for the adults varied from 69% in 2010 to 995% in 2012 (Figure 3 left). For the larvae, the highest difference is in relation to 2010, showing this year a 465% increase (Figure 3 right).

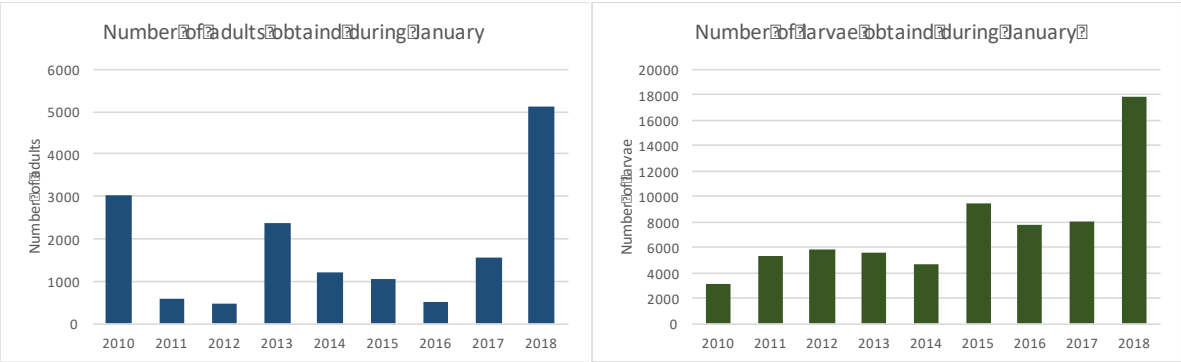

Figure 3. Total mosquito adults (left) and larvae (right) numbers obtained during the past Januarys by DHBs in New Zealand.

* Please note that the numbers shown are totals and that sampled effort may have varied over the time.

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