



## BORDER HEALTH NEWSLETTER – June 2014

### WELCOME!

Kia ora koutou and greetings from Wellington. I am glad we had sunshine and drizzle when we joined the local PHU for their mozzie run recently because its hailing as I type! The low temperatures and high rainfall we've experienced in many areas around the country over the last few weeks is clearly reflected in the drop in positive samples collected. Thanks for entering all those samples thoroughly into the database despite minor technical issues we had, caused by a quality check. Make sure you check the NZBEL contact information below as we have our new landline number!

### INCURSIONS/INTERCEPTIONS

There were two interceptions during June. The first involved a male *Culex quinquefasciatus* possibly brought from Taiwan with a shipment of new tyres to Auckland. The second was unfortunately damaged and most likely one of our own *Culex sp.* found in the Auckland Airport MPI Quarantine Inspection Room.

### SAMPLES

During June 457 samples were collected by staff from 12 District Health Boards with 55 positive. Samples collected, including positives, were generally below numbers of last month and above this time last year. The number of adults was 3 times less than last month and 10 times higher than last year. The number of larvae was slightly below last month and well above June last year. While *Culex quinquefasciatus* was dominant in recent months, this June a greater number of *Cx. pervigilans* larvae was found.

Species	Adults		Larvae	
	June 2014	June 2013	June 2014	June 2013
<b>New Zealand Mozzies</b>				
<i>Aedes antipodeus</i> (winter mosquito)	Nil	1	1	Nil
<i>Ae. australis</i> (saltwater mosquito)	Nil	Nil	Nil	2
<i>Ae. subalborostris</i>	Nil	Nil	Nil	Nil
<i>Ae. notoscriptus</i> (striped mosquito)	Nil	Nil	731	548
<i>Culex astilae</i>	Nil	Nil	5	Nil
<i>Cx. pervigilans</i> (vigilant mosquito)	5	1	287	59
<i>Cx. quinquefasciatus</i> (southern house mosquito)	35	2	179	154
<i>Opifex fuscus</i> (saltpool mosquito)	Nil	Nil	17	Nil
<b>Total</b>	<b>40</b>	<b>4</b>	<b>1219</b>	<b>763</b>



Woman in Sri Lanka reads the first mosquito repellent newspaper, <http://pickstuff.net>

### Did you know?

Sri Lanka published a mosquito-repelling newspaper printed with ink mixed with citronella. Sri Lanka's Mawbima holds the distinction of printing "the world's first mosquito-repelling newspaper," according to Core77. With the help of advertising agency Leo Burnett, the publication carried out a multi-step campaign in an attempt to help combat dengue, a mosquito-borne disease. Mawbima began by placing large posters at bus shelters throughout the country. Each of these notices was coated with citronella, a natural insect repellent. Following that, Mawbima published a week-long series of educational articles detailing ways to combat the disease, before finally printing a special edition of the newspaper on World Health Day. The ink used was mixed with citronella in hopes of dissuading the deadly mosquitos from feeding on readers.

## INSECT-BORNE DISEASES

### Recent Local News

The numbers of Zika virus in New Zealand are alarming. Here is an excerpt from ESR's monthly reports:

Three probable cases were notified in March 2014. The cases were all males in the 15–19 years, 40–49 years, 50–59 years age groups from Taranaki (2 cases) and Waitemata (1 case) DHBs. All three cases were in the Cook Islands during the incubation period.

19 cases were notified in April 2014 (1 confirmed, 6 probable, 12 under investigation). Fourteen cases were female and five male. The age range for cases was 15–73 years with the highest number of cases in the 20–29 years age group (8 cases). Cases were distributed by DHB as follows: Auckland (9 cases), Waitemata (5 cases), Counties Manukau (2 cases), and Southern, Taranaki, Waikato (1 case each). All cases were in the Cook Islands during the incubation period.

10 cases were notified in May 2014 (4 confirmed, 4 probable, 2 under investigation). Seven cases were female and three male. The age range for cases was 15–73 years with the highest



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number of cases in the 50–59 years age group (4 cases). Cases were distributed by DHB as follows: Waikato (3 cases), Auckland and Counties Manukau (2 cases each), and Waitemata, Lakes and Taranaki (1 case each). Overseas travel during the incubation period was recorded for 9 (90.0%) of cases of which all cases except one travelled to the Cook Islands. The remaining case had travelled to Tonga. Check out our website for information about Zika Virus: <http://www.smsl.co.nz/Services/New+Zealand+BioSecure/Viruses.html>

### 1st case of mosquito-borne disease in Polk

Winter Haven, Florida -- A mosquito-borne illness affecting hundreds of thousands of people in the Caribbean has made its way to Florida.

So far, there have been three cases of chikungunya in Hillsborough County and one in Pasco. On Tuesday, Polk County also confirmed its first case of the disease. The infected victim, who lives in Poinciana, had recently traveled to the Caribbean. Officials have not released the person's gender or age.

"The name comes from Swahili, for 'walking bent over,'" says Dr. Daniela Chiriboga with the Polk County Health Department. "That gives you an idea how you feel."

Symptoms include fever, severe joint pain, headaches.

"Wear long sleeves, repellent, long pants," Dr. Chiriboga advises.

There have been 48 confirmed cases of chikungunya in Florida, but all of them have been imported. The disease is transmitted to humans by infected mosquitoes. It has been documented in 40 countries in Asia, Africa, Europe and the Americas.

There is no vaccine or medication to prevent the disease, but it rarely kills those infected.

"Right now, there is an outbreak in all of the Caribbean islands," says Dr. Chiriboga.



The first case of chikungunya has been found in Polk County.

It's a warning to those getting ready to travel that they should protect themselves.

The first four have various levels of DEET and scored 98 out of 100, and "Off Deep Woods Sportsmen two" was the cheapest per ounce. All of them worked for at least seven hours.

Symptoms

People at increased risk for severe disease include newborns, senior adults, and people with chronic conditions such as diabetes, hypertension, cardiovascular disease, etc.



Symptoms of chikungunya include sudden onset of high fever (>102F), severe joint pain mainly in the arms and legs, headache, muscle pain, back pain and rash. Symptoms appear on average three to seven days after being bitten by an infected mosquito.

Most patients feel better after a few days or weeks, however, some people may develop long-term effects.

Complications are more common in infants younger than a year old; those older than 65; and people with chronic conditions such as diabetes and hypertension.

If you experience symptoms of chikungunya fever, consult with your health care provider immediately and protect yourself against further mosquito bites.

Jennifer Titus, WTSP 5:42 p.m. EDT June 24, 2014 The Associated Press contributed to this report.

### INTERESTING WORLD NEWS

#### **Researchers believe they have found a way to genetically engineer mozzies and their appetites.**

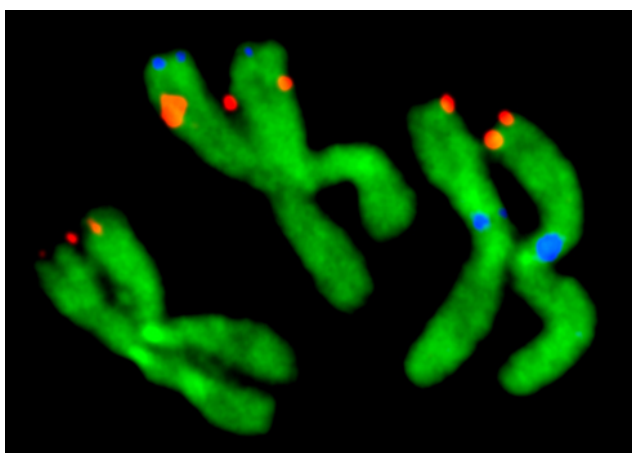
There's nothing quite as frustrating as an itchy mosquito bite and UK researchers think they might have found a way to stop them for good.

Only female mosquitoes bite and a research team from Imperial College London believes they have found a way to genetically engineer mozzies so that they only produce male offspring.

Like humans, male mosquitoes have an X and a Y chromosome, with the X being inherited from the mother and the Y being inherited from the father.

Females have two X chromosomes – one inherited from each parent, and if one is damaged, the female offspring won't survive.

The researchers added a gene to the mosquitoes that cuts up the X chromosome when sperm is produced, so that when males mate with females, they produce mostly male offspring, and the same thing happens when those offspring go on to mate.



"Shredding of the paternal X chromosome prevents it from being transmitted to the next generation, resulting in fully fertile mosquito strains that produce 95 percent male offspring," researchers Roberto Galizi and Andrea Crisanti wrote.

But as annoying as mozzie bites are, the real reason for the research is the hope of stopping the spread of mosquito-borne diseases like malaria and dengue fever.

The red and blue signals indicate positions of interest for researchers on the chromosomes of the mosquito *Aedes aegypti*, the principal carrier of dengue and yellow fevers. Courtesy of Maria Sharakhova.



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The researchers believe this approach could be used with many species of mosquito in the hope of stopping the spread of deadly viruses.

"The research is still in its early days, but I am really hopeful that this new approach could ultimately lead to a cheap and effective way to eliminate malaria from entire regions," Galizi said.

Mosquito-borne diseases kill 725,000 people each year, with malaria alone thought to kill almost 500,000 children. Malaria infects more than 200 million people every year and dengue infects up to 400 million people each year. There is no vaccine against either.

Dr Cameron Webb, a mosquito expert from the University of Sydney, believes that while this finding sounds good in theory, what works in the laboratory might not work in the wild.

"Even though lab studies are encouraging, there are a lot of factors that may mean that this doesn't apply equally well in the field," he said.

"There are dozens of mosquito species that spread malaria, so you would need to still use other techniques. "Usually when you are dealing with genetically modified mosquitoes, they might not be quite as strong outside the laboratory – there might be disadvantage when it's out in the wild, so the mosquitoes might not be as good at mating or might not survive as well."

Dr Webb said it's also difficult to know how many of these genetically-modified mosquitoes researchers would need to release into the wild to have an effect.

"In the laboratory studies, they had about three times the amount of genetically modified mosquitoes mixed with the wild ones for it to work," he said.

"Africa has hundreds of millions of people getting malaria every year, so how many mosquitoes do you have to set out into the environment before you have an effective population control of mosquitoes?"

"That is something you will only know when they start to scale up from these lab studies."

Researchers would also need to determine that mosquitoes weren't a source of food for other species in the regions where they are looking at eradicating them.

"Some mosquito species probably have a potentially important ecological role in the local environment," Dr Webb said.

"You then have that question of whether it really is in the best interests of the local environment to eradicate mosquitoes."

Kimberly Gillan

### **Extracts from the seeds of a common plant can kill mosquito larvae, report two teen researchers**

The teens reported their findings here last week, at the Intel International Science and Engineering Fair, or Intel ISEF. The competition was created by Society for Science & the Public (which publishes Science News for Students) and is sponsored by Intel. Each year, Intel ISEF showcases some of the best high school science projects from around the globe.

*Bixa orellana* is a small tree or shrub found in many tropical regions in the Americas. Its bright red seeds already have many uses, says Ester Castro, 17. She's an 11th-grader at Asuncion Rodriguez de Sala in Guayanilla, Puerto Rico. Extracts from the seeds are a popular food coloring, she notes. Powdered seeds also are part of spice mixtures used in cooking.



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Ester Castro (left), 17, and Keren Galarza (right), 16, of Guayanilla, Puerto Rico, found that extracts from the seeds of a common plant kill mosquito larvae.

PATRICK THORNTON/SSP

Ester and classmate Keren Galarza, 16, wanted to see if chemicals in the seeds might repel mosquitoes. The seeds contain many compounds. Some of the chemicals are smelly, oily substances that float on water. These are called "volatile oils" because they contain aromatic substances that evaporate easily. Others compounds are part of a thick, sticky substance called resin. The red substance used as a food coloring is called bixin, after the plant. The liquid that's left behind when all of these substances are removed contains a yellow coloring, called orellina.

To separate those four main ingredients, Keren and Ester first ground the seeds. Then they used two separate procedures. In one, they added water to the mush and stirred it. From this, they skimmed off the resin and volatile oils.



They used a second process to extract the food colorings from the mush. Here, they added a mild solution of sodium hydroxide to the mush, stirred the mix and filtered it. Then they added hydrochloric acid to the liquid that had passed through the filter, and filtered it once more. The solid material that remained stuck to the second filter was bixin, says Ester. The liquid that passed through that filter contained orellina.

Once Keren and Ester had these four ingredients — the bixin, orellina, resin and volatile oils — they tested each on the swimming larvae that had hatched from mosquito eggs. The three-week-old larvae had been growing in six separate containers. At the start of the teens' tests, each tank contained between 70 and 100 larvae.

The teens left one tank untreated. It served as a baseline. Anything that happened after the other treatments would be compared against it, Keren explains. Twice a day, the teens treated the other tanks. In four of them, the teens added one *Bixa* ingredient, each slightly diluted by water. (So one tank got bixin, another orellina or resin or the volatile oil.) In the last tank, they added an equal mix of all four ingredients.

For each treatment, the teens added 3 milliliters of the test solution. (That's a little more than half a teaspoon, which usually contains about 5 milliliters.)

Red seeds of the common plant *Bixa orellana*. Sometimes used as a food coloring, extracts of these seeds also kill the larvae of mosquitoes.



The volatile oil and orellina treatments didn't kill many mosquito larvae. Solutions with bixin or resin killed slightly more. But adding all four ingredients together worked best, the teens found. After five days, no larvae survived this four-ingredient cocktail.

The extract mix also might work against adult mosquitoes, the teens report. When they



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added the four-ingredient cocktail to candle wax (and sprinkled a few seeds on top of the candle for good measure), smoke from the candle seemed to repel the biting insects. Extracts from the *Bixa orellana* seeds could be used instead of commercial pesticides to get rid of mosquitoes, the teens suggest. Using candles scented with these natural extracts could help to scare the current generation of the pesky insects out the neighborhood. And the extracts themselves could help to kill the next generation before it takes wing.



Each year the week of June 26 is declared National Mosquito Control Awareness Week by the American Mosquito Control Association. AMCA's "Mosquito Week" educates the general public about the significance of mosquitoes in their daily lives and the important service provided by mosquito control workers throughout the United States and worldwide.

### NZBEL Contact Details

We have a new landline: 04 566 3311 – Select Option 4

#### BUSINESS HOURS – 7.30am-4.30pm

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#### AFTER HOURS

For suspected exotic mosquitoes after hours  
Call "0800mozzie" – Refer EH Manual Procedures  
Oncall Entomologist – 021 522 476

#### COURIER

New Zealand BioSecure  
2-4 Bell Road South  
Gracefield Lower Hutt

#### POSTAL

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Please do not use standard post to the physical address – use the PO Box, there is no letter box. Thank You.