BORDER HEALTH NEWSLETTER – October 2014

WELCOME!

Welcome back everybody. For those who have been at the Integrated Pest Management and Vector course in Snells Beach, I hope you enjoyed the workshop as much as I did. It was really great to see you in action.

EBOLA is still a hot topic, the training scenario of a chikungunya outbreak in Leigh Harbour lead to discussions about a possible insect transmitting the Ebola virus. There are very few published vector competence studies on Ebola but no virus replication was recorded which suggests they are unlikely to be natural hosts of the virus. Phew! However, we need to ensure our mosquito control is up to date. Just because Ebola from mosquitoes poses no risk, it doesn't mean that we should let our protection from other diseases such as Malaria, Dengue and Chikungunya virus slip.

SAMPLES

During October 665 samples were collected by staff from 12 DHBs with 99 positive. While numbers of *Ae notoscriptus* increased this time of the year in 2013, this year the number went slightly down from September to October. The numbers of *Cx. pervigilans* increased but not as much as last year.

Species	Adults		Larvae	
New Zealand Mozzies	**Oct 2014**	**Oct 2013**	**Oct 2014**	**Oct 2013**
Aedes antipodeus (winter mosquito)	5	Nil	Nil	Nil
Ae. australis (saltwater mosquito)	Nil	Nil	4	Nil
Ae. subalborostris	Nil	Nil	Nil	Nil
Ae. notoscriptus (striped mosquito)	2	2	1334	1464
Culex astilae	Nil	Nil	Nil	Nil
Cx pervigilans (vigilant mosquito)	2	20	394	820
Cx. quinquefasciatus (southern house mosquito)	Nil	9	15	Nil
Opifex fuscus (saltpool mosquito)	Nil	Nil	8	19
Total	**9**	**31**	**1755**	**2303**

INCURSIONS/INTERCEPTIONS

We had three interception events this month. All of them in Auckland; Ports of Auckland, Auckland Airport and MG Marketing Penrose transitional facility. All specimens were identified as Chironomids, *possibly Chironimus zealandicus*.

WEBSITE

We have added a template for the sample tube labels under the NZBEL pages for you to download and print labels. We are currently refreshing the website for a more modern viewing and responsiveness to portable devices and you may see a few changes occurring over the next month. If you have any suggestions or feedback, we would love to hear from you, feel free to email us at enquiries@smsl.co.nz..

NEWS OF THE MONTH

Guangzhou Turns to Mosquito-Eating Fish to Help Control Dengue Outbreak

By AUSTIN RAMZY OCTOBER 28, 2014

The southern Chinese city of Guangzhou has introduced a fish that eats mosquito larvae, in an effort to control its worst-ever dengue fever outbreak, state news media have reported.

Some scientists have warned that use of the nonnative mosquito fish could have unexpected consequences, while others say that mosquito fish are already found in Guangdong waters and the environmental impact might not be significant, but that the effectiveness of the fish may also be limited.

As of Monday, the number of dengue cases in Guangdong Province this year had reached 41,155, the local health authorities reported, with six deaths. The province has seen 200 to 300 new cases a day in recent days. That is lower than the more than 400 per day last week and the more than 1,000 per day the week before that, offering some hope that the outbreak is beginning to ease.

Guangzhou, the capital of Guangdong and China's third-largest city, has seen the most cases, with more than 34,000 reported infections and one death, followed by the city of Foshan, with more than 3,000 cases and one death.

Officials, blaming the outbreak this year on inadequate mosquito control efforts, have increased the application of pesticides in Guangzhou in an effort to reduce the insect population. The city's water bureau also announced on Oct. 15 that it had introduced mosquito fish from North America to "controllable static waters," Xinhua, the state-run news agency, reported.

That move prompted criticism from some experts who suggested it could upset the ecological balance in Guangdong waterways.

"The best solution to the dengue problem is to improve the overall environment," Li Yanliang, chairman of the National Aquatic Wildlife Conservation Association, told Xinhua. "Introducing foreign species must be meticulous. The impacts must be controlled."

Liu Hansheng, an official with the Administration of Oceans and Fisheries, told Guangzhou Daily that the fish were invasive and that their introduction should be carefully controlled.

"Previously the nation brought them in to help control mosquitoes, but afterward they spread," Mr. Liu told the newspaper. "Whether or not this leads to a disaster, the city of Guangzhou at present doesn't have enough data to say."

Guangzhou Daily reported that the small, finger-length fish were first brought to China in 1924 and introduced to West Lake in Hangzhou. The fish then spread to other bodies of water, and since 2006 they have been introduced to parks in Guangzhou to control mosquitoes.

"Mosquito fishes are already widespread all over southern Guangdong, and I would doubt very much that adding any more would have much effect — either on the mosquitoes or on the ecology of the receiving waters," David Dudgeon, a professor of ecology and biodiversity at the University of Hong Kong, wrote in an email.

Scientific opinion on the effectiveness of the mosquito fish is divided, Dr. Dudgeon said. While the fish do eat mosquitoes, the insects are not the fish's preferred food. And the mosquito fish can have a harmful effect by eating the eggs and larvae of other native species. If mosquitoes are breeding in flower pots, puddles and other small bodies of water where the fish aren't introduced, then their effect will be further limited.

Medicated Mosquito Nets Distributed

By Express News Service

Published: 01st November 2014

Junior Chamber International (JCI) Thiruvananthapuram, as part of its 'Clean India and Eradicate Mosquito' campaign donated 101 medicated mosquito nets to General Hospital here on Friday at a function held at the tele-medicine hall of the hospital. Mayor K Chandrika handed over the mosquito nets to Dr Fazeelathu Beevi, superintendent of the General Hospital.

As part of the campaign, JCI has carried out several programmes on keeping our surroundings clean for the prevention and eradication of mosquitoes and taking preventive measures such as using medicated mosquito nets. JCI India has distributed more than one lakh medicated mosquito nets to various hospitals and houses near the slums across the country so far.

It aims to protect at least five lakh lives from infectious diseases transmitted through mosquito bites by supplying such nets.

Kaohsiung to reward mosquito catchers

CNA 2014-11-02

Kaohsiung residents will be able to turn pests into positivity, as the city plans to reward those who have caught the most mosquitoes by Saturday.

In a campaign that started Wednesday, city health authorities have asked the public to collect as many mosquitoes as possible and tally them on Saturday in a bid to remove the principal transmitter of the disease. Mosquitoes are carriers of dengue fever and have contributed to the outbreak in the southern Taiwan city. The pests being targeted are *Aedes aegypti* and *Aedes albopictus*, also known as the yellow fever mosquito and the tiger mosquito, respectively.

According to the city's Department of Health, which is organizing the campaign, the winner will be the person who has caught the largest number of those two types of mosquitoes -- regardless of their state of being (mature or in larval form), alive or dead. "Instead of fining people who fail to remove standing water and other breeding sites around their homes, we think this program could

raise greater community participation," said Ho Hui-ping, chief of the section in the Health Department responsible for the campaign. The No. 1 mosquito keeper will be rewarded NT$3,000 (US$100), while the top 10 contestants will each be given free bug spray and mosquito nets, according to Ho.

To be eligible for the prizes, participants must bring their catches to Alley 161, Lichi Street in Kaohsiung between 8am and 10:30am Saturday, she said. The results will be announced after city staffers tally the number of mosquitoes turned in. That will be followed by a community cleaning event, according to the department. The competition is among the city's more unconventional approaches to clear it of the mosquitoes amid an outbreak of over 7,500 cases of dengue fever by the end of October, including five more severe hemorrhagic dengue fever cases.

Another idea under consideration is to use sea water to flush out the city's drainage system and thus destroy mosquito breeding grounds, the city government said.

PICTURE OF THE MONTH

Health workers and mosquito mascot at an anti-dengue fever event in Kaohsiung, (Photo/CNA)

VECTOR-BORNE DISEASES
Recent Local News

ESR Monthly Notifiable Disease Surveillance Report

Chikungunya fever: One confirmed case of chikungunya fever was notified in September 2014. The case was a female in the 60–69 years age group from Waitemata DHB. The case was in Samoa during the incubation period.

Rickettsial disease: One case of confirmed murine typhus (*Rickettsia typhi*) was notified in September 2014. The case was a male in the 60–69 years age group from Waikato

DHB. The case lives in the bush and has contact with rats.

Ross River virus infection: One case of Ross River virus infection was notified in September 2014. The case was a male in the 50–59 years age group from Northland DHB. The case was in Australia during the incubation period.

Typhoid fever: Three cases of typhoid fever were notified in September 2014 compared to zero cases notified during the same month of the previous year. The cases were from Auckland (2 cases) and Tairawhiti (1 case) DHBs. The cases were in the 5–9 years (2 cases) and the 30–39 years (1 case) age groups. All cases were hospitalised. Two cases reported travelling during the incubation period and the countries they visited were India and Pakistan. The case that did not report overseas travel had contact with a relative from India who had typhoid fever before coming to New Zealand.

Pacific syndrome surveillance report Week 43, ending 26 October, 2014
Chikungunya outbreaks are on-going in American Samoa, French Polynesia , Samoa and Tokelau. As of week ending 19 October 2014, there were 287 confirmed cases of Chikungunya in French Polynesia since 10 October 2014.

Dengue serotype-1 outbreak continues in French Polynesia.

Ebola Virus Disease: The EVD outbreak is on-going. As at 27 October 2014, 13 703 (suspected, probable and confirmed) cases and 4922 deaths of Ebola have been reported. Additional 3 792 cases have been identified throughout the epidemic period after a more comprehensive assessment of patient database. Majority of the cases is in countries with intense and widespread transmission (Liberia, Sierra Leone and Guinea). Five countries (Mali, Nigeria, Senegal, Spain, and the United States of America) have now reported a case or cases imported from a country with widespread and intense transmission.

USA
Dengue Fever Mosquito Spotted In California

October 30, 2014
The deadly dengue fever mosquito has surfaced in the San Diego, California area. The dengue hemorrhagic fever mosquitoes are also known as yellow fever mosquitoes. Most of the viruses the insect can spread are native to Central America and Mexico. The dengue fever mosquitoes (Aedes aegypti) were found in an office building on the 32nd at San Diego's Street Naval Station, according to the Los Angeles Times. The Dengue fever mosquitos were also reportedly discovered in the Los Angeles area counties of Pico Rivera and Commerce earlier this month. The mosquitoes from Central America and Mexico are also known to transmit the chikungunya virus in addition to dengue fever. The disease which produces paralyzing joint pain has reportedly ravaged portions of Latin America, Africa, and Central America. The Chikungunya virus is a mosquito-borne illness that prompts intense pain and high fevers, and it is also spreading in Canada and Mexico. Patients ill with the virus are now present in nearly 20 countries. There is no cure. The vast majority of the Chikungunya virus cases in the United States have occurred in Florida. The virus is believed to have been spread from

individuals who became ill while traveling outside of the country and by immigrants. The dengue fever and Chikungunya virus mosquitoes are also believed to have been carried into the United States on clothing, baggage, liquids, and food. The massive influx of illegal immigrants crossing into California and Texas during the summer months may have contributed to the presence of insects in America now. Although the dengue fever mosquitoes have only been recorded in California, the insects could also now present in other border or high-travel areas.

WORLD OF MOSQUITO-SCIENCE

Rare Blood-Engorged Mosquito Fossil Found

By Douglas Main, Staff Writer

The fossil of a blood-engorged mosquito was found in northwestern Montana.
About 46 million years ago, a mosquito sunk its proboscis into some animal, perhaps a bird or a mammal, and filled up on a meal of blood. Then its luck turned for the worse, as it fell into a lake and sunk to the bottom.

Normally this wouldn't be newsworthy, and nobody would likely know or care about a long-dead insect in what is now northwest Montana. But somehow, the mosquito didn't immediately decompose — a fortuitous turn of events for modern-day scientists — and became fossilized over the course of many years, said Dale Greenwalt, a researcher at the National Museum of Natural History in Washington, D.C. Greenwalt discovered the mosquito fossil after it was given to the museum as a gift, and he immediately realized the specimen's rarity. It is, in fact, the only blood-engorged mosquito fossil found, Greenwalt told LiveScience. The fossil is even stranger because it comes from shale, a type of rock formed from sediments deposited at the bottom of bodies of water, as opposed to amber, the age-old remains of dried tree sap, in which insect remnants are generally better preserved.

"The chances that such an insect would be preserved in shale is almost infinitesimally small," Greenwalt said. In their study, Greenwalt and his collaborators bombarded the mosquito fossil with molecules of bismuth, a heavy metal, which vaporizes chemicals found in the fossil. These airborne chemicals are then analyzed by a mass spectrometer, a machine that can identify chemicals based on their atomic weights, Greenwalt said. The beauty of this technique, called time-of-flight secondary ion mass spectrometry, is that it doesn't destroy the sample — previously, similar techniques required grinding up portions of fossils, he added. The analysis revealed hidden porphyrins, organic compounds found in hemoglobin, the oxygen-carrying protein in blood, hidden in the fossilized mosquito's abdomen.

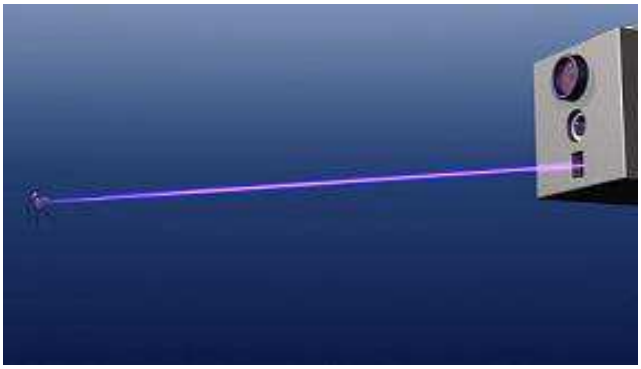
The finding may bring to mind the story of "Jurassic Park," a novel and movie in which scientists resurrect dinosaurs from DNA preserved in blood-engorged mosquitoes preserved in amber. Although this finding doesn't really make this fictitious story any more likely, it does show that complex organic molecules besides DNA can be preserved for a long time, Greenwalt said. The discovery also shows that "blood-filled mosquitoes were already feeding at that time, suggesting that they were around much earlier and could have fed on dinosaurs," said George Poinar, a paleo-

entomologist at Oregon State University, who wasn't involved in the research. Greenwalt said he had no way of knowing exactly how the mosquito was preserved so well. Perhaps the most likely hypothesis is that the insect was trapped in a covering of water-suspended algae, which are capable of coating specimens in a sticky, gluelike material, before sinking to the bottom; this algae process has been shown to fossilize other types of insects, he said.

Researchers don't know what kind of animal the blood came from, since hemoglobin-derived porphyrins amongst different animals appear to be identical, Greenwalt said. The study is exciting, because it provide more evidence that porphyrins, organic compounds found in "virtually all living organisms from microbes to humans in varying amounts" are "extremely stable" — and are thus a perfect target for studying long-dead plants and animals, said Mary Schweitzer, a researcher at the North Carolina Museum of Natural Sciences, who wasn't involved in the study.

DID YOU KNOW?

A Mosquito Zapping Laser That Fights Malaria? Yes!



A laser to stop malaria? I get to zap mosquitoes and save the world? Sign me up.
Intellectual Ventures Lab is shooting mosquitoes out of the sky with lasers. The invention-focused company received funding from the **Bill and Melinda Gates Foundation** to find solutions for many of the world's leading health problems, including malaria. Using cheap components from various commercial technologies (laser printers, digital cameras, etc) IVL has devised a fence-like system which would monitor for mosquitoes and zap them as they try to fly by. By controlling the mosquito population the company hopes to stop the spread of malaria, which kills more than a million people each year. For those who just want to see the laser in action, check out the brief video from National Geographic after the break. A more in depth discussion, and a live demo (12:32), can be seen in Nathan Myhrvold's recent TED talk below. IVL's foray into mosquito hunting is awesome looking. Growing up I received enough 'squito bites that watching their burning deaths has become very cathartic. But there are more important factors at work here than just marveling at what lasers can destroy. Humanity is faced with several grand challenges, and among these are poverty, hunger, environment, health, and energy. These problems are responsible for millions of death each year, and have ramifications for everyone on the planet. That's why groups like Singularity University, Bill and Melinda Gates Foundation, and others want to use advancing technology to mitigate or maybe even solve some of these issues. IVL's plan to combat malaria is one such application of technology, and Myhrvold discusses a few more in his talk. Hopefully, this is just the beginning of a much larger trend wherein the best and brightest minds are given the funding and the materials needed to find sustainable solutions for Earth's troubles.