



BORDER HEALTH NEWSLETTER – April 2015

WELCOME!

Hi everybody. Another month passed by with many interesting samples thanks to you. If you want to know more about mozzies, if you'd like to discuss the surveillance you carry out, your sample sites or certain techniques, if you are new to Mosquito surveillance or simply curious about what happens to your samples after you have sent them away, you should consider a visit for a few days of "mizzie clinic" at NZBEL. The lab training was highly recommended by our first 3 test-groups and enlightened the visitors in many ways. See Jonathan counting comb scales of an *Ae. aegypti* larvae.



Please remember, the URL for the National Online Mosquito Database has been changed.

For your login please use:

<http://www.nzbiosecure.neocom.geek.nz/sampling/Login.asp>

As usual you can access the database through our website smsl.co.nz via NZBEL – Entomology Laboratory page.

SAMPLES

During April 830 samples were collected by staff from 12 DHBs with 246 positive. The numbers of *Culex quinquefasciatus* numbers were significantly higher than last year but seem to be on decreasing recently, whereas *Cx. pervigilans* seems relatively stable. We have had no *Aedes antipodeus* larvae in the last two months but 50 in April last year. *Ae. notoscriptus* numbers decrease compared to both April this and last year.

| Species | Adults | | Larvae | |
|---|------------|------------|-------------|-------------|
| | Apr 2015 | Apr 2014 | Apr 2015 | Apr 2014 |
| New Zealand Mozzies | | | | |
| <i>Aedes antipodeus</i> (winter mosquito) | Nil | 1 | Nil | 50 |
| <i>Ae. australis</i> (saltwater mosquito) | 3 | Nil | 16 | 13 |
| <i>Ae. notoscriptus</i> (striped mosquito) | 5 | 40 | 2485 | 1304 |
| <i>Culex astilae</i> | Nil | Nil | 37 | Nil |
| <i>Cx pervigilans</i> (vigilant mosquito) | 17 | 59 | 963 | 1297 |
| <i>Cx. quinquefasciatus</i> (southern house mosquito) | 269 | 353 | 4160 | 477 |
| <i>Opifex fuscus</i> (rockpool mosquito) | Nil | 6 | 79 | 62 |
| Total | 297 | 459 | 7740 | 3203 |



INCURSIONS/INTERCEPTIONS

We have had 4 Interceptions in April:

10.4.2015: One live female mosquito from Auckland airport international terminal building - was badly damaged and had lost the abdomen. It could only be identified as a *Culex sp.*

20.4.2015: 8 live mosquitoes found in several containers with molasses at a devanning site - Port of Tauranga by MPI already on the 15.4. PHU was notified on the 20.4. and the specimen were identified as 5 female and 3 male *Cx. quinquefasciatus*.

28.4.2015: A non-mosquito was found alive in a fresh flower foliage at the Auckland International Airport and was identified as a winter gnat *Trichocera sp.*

29.4.2015: A pupal exuviae of a non mosquito was found at the Auckland International Airport in a confiscated bottle of holy water from the Ghangi in India. The midge pupa was of the Culicomorpha group of Diptera.

NEWS OF THE MONTH

Hong Kong reports 1st ever rare yellow fever vaccine reaction

Posted by Staff on April 16, 2015

On the heels of a US Centers for Disease Control and Prevention (CDC) report of a case of yellow fever vaccine-associated viscerotropic disease (YEL-AVD) in a Oregon woman, the Hong Kong Drug Office of the Department of Health (DH) has reported the first ever case in the city.

The patient, a 65-year-old man, who had good past health presented with fever and delirium to the emergency room nine days after receiving a yellow fever vaccine in preparation for a trip to South America in February.

Yellow fever vaccine-associated viscerotropic disease (YEL-AVD) occurs on very rare occasions after the first immunization with the yellow fever vaccine. Onset is within 10 days of vaccination and the pathological process is characterised by severe multi-organ failure and an overall case-fatality rate in excess of 60%. Known risk factors include a history of thymus disease such as thymoma or thymectomy and aged 60 years and older.

According to health officials, the patient received a dose of yellow fever vaccine in preparation for a leisure trip to endemic regions in Peru and Brazil, after considering the risks and benefits.

He developed fever and malaise five days after vaccination and a short trip to Mainland China. His condition got worse in the next four days with high fever (up to 40C) and delirium.

On admission to the hospital, investigations showed deranged liver function. Imaging studies of the brain showed no abnormality. Other communicable diseases such as dengue fever, rickettsia, malaria and typhoid were excluded. His cerebrospinal fluid and blood specimens were later tested positive for yellow fever virus (vaccine strain) by nucleic acid testing.

He was given supportive treatment for two weeks and discharged from hospital without long term sequelae. He continued his trip as planned to South America two months later. No similar case of yellow fever vaccine-associated adverse event was reported to date.



Yellow fever mosquitoes found at Anaheim home

April 27, 2015 BY JENNA CHANDLER

Orange County Register

There's a new mosquito in town. It's an aggressive and relentless biter called the yellow fever mosquito,



[*Aedes aegypti* J.K.],

and it has vector control officials worried – but not for the reason typically associated with mosquitoes and Orange County.

Though this type of mosquito is capable of transmitting West Nile Virus, it's more likely to carry such debilitating tropical diseases as dengue, chikungunya, and yellow fever.

It was detected last week for the first time in Orange County, vector control officials said Monday, though it has popped up around California, including in Los Angeles County, the past several years. No one has fallen ill.

Inspectors discovered the insect's eggs April 21 on the stem of a "lucky bamboo" plant inside an Anaheim home. The family called vector control after having been repeatedly bitten for the past three weeks, Orange County Vector Control District spokesman Jared Dever said.

The mosquitoes were striking inside the house during the daytime – a tell-tale sign that the bites were not the work of a native species, which emerge after sunset to avoid predators.

Dever said it does not appear the yellow fever mosquito is making a widespread appearance in Orange County. In the past week, only a few adults have turned up in traps – all on that same property. Of those, all but one, from a backyard trap, were collected inside, he said.

"We have not been able to retrieve anything beyond that residence so far – so that's very good news," he said. "They don't move very far on their own. Once they find a suitable habitat, where they have a water source for their young to breed and a blood meal source, like a resident, they don't move around," Dever said. "They will identify you're a blood meal and at that point they're not going to leave you alone," Dever said.

But because they don't tend to go after birds, which carry West Nile Virus, it does not seem likely they will provoke another outbreak of that virus this year. Last year, a West Nile Virus outbreak killed eight people in Orange County, which had 10 percent of all West Nile Virus cases nationwide.

The yellow fever mosquitoes will only spread diseases if they bite an infected person. Last year, there were 126 cases of dengue and 119 cases of chikungunya reported across California. All people had traveled to countries where those diseases are present, mostly Latin America, according to the California Department of Public Health.

The public is asked to report tiny black and white, day-biting mosquitoes to Orange County Vector Control, 714-971-2421.



After Record Drought, Dengue Fever Is Now Sweeping Across Sao Paulo

Bloomberg Business

April 22, 2015 by David BillerChristiana Sciaudone

For six months, taps ran dry 12 hours a day in Gregori Pizzanelli Leccese’s Sao Paulo neighborhood. Many residents stored water just to get by.

It’s no wonder the mosquito population exploded — and so did dengue fever, he said.

“I’ve seen a major increase of mosquitoes in the city over the past five years,” said Leccese, 28, who runs a clothing manufacturer with his father. “I see nothing about prevention education anywhere.”

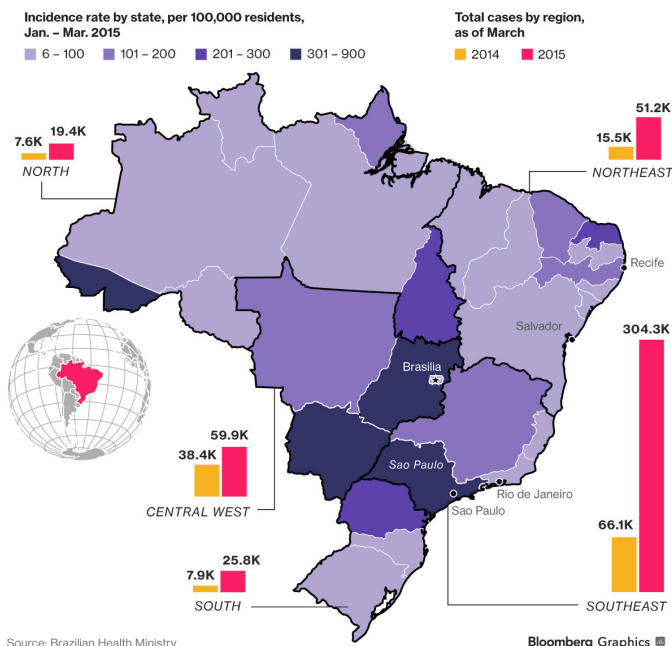
Leccese is among the 460,500 Brazilians who caught the potentially deadly disease this year through March 28, more than triple the number a year earlier, the Health Ministry said (PDF). Eight thousand of Sao Paulo city’s 12 million residents already have been infected, and the city forecasts 82,000 more cases, almost all in the next few months. The ministry said in March more than 300 other municipalities also are at risk of an epidemic.

While dengue affects tropical nations the world over, from Singapore to Colombia, the water shortage in Sao Paulo is exacerbating the problem, said Alessandro Giangola, coordinator of the city’s program to control the mosquito that transmits the virus. About half of Sao Paulo city residents complained of water cutoffs in a survey conducted by polling company Datafolha released in October, before Brazil’s seasonal rains arrived in February.

The rainfall has eased shortages, but many residents still store drinking supplies in pots, drums and tanks. That may be worsening the outbreak because the water can be breeding grounds for mosquitoes carrying the virus, Giangola said.

Dengue Fever Spreads In Brazil

More than half of Brazil’s cases are in wealthy Sao Paulo state



More than half of Brazil’s cases are in wealthy Sao Paulo state. Last year, the state accounted for about a quarter of infections, the ministry said.

As Sao Paulo’s main reservoirs dried up amid the worst drought in eight decades, President Dilma Rousseff and Sao Paulo Governor Geraldo Alckmin, of the opposition Social Democratic party, sparred over blame before the October elections. Only after both were re-elected did they promise to cooperate and signed contracts for new pipes to integrate systems.

Alckmin’s press office didn’t respond to requests for comment, and Rousseff’s declined to comment on whether politics influenced the federal government’s response to the water crisis.

The government could have done more to stop leaks from the water system, Leo Heller, the United Nations special rapporteur for water and sanitation rights, said in a December

interview. About 31 percent of treated water escapes from the Sao Paulo utility’s network — more than a third caused by illegal siphoning.

Until recently, Sao Paulo resisted restrictions that U.S. states such as California have enforced,



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including requiring restaurants to serve water only when asked and setting specified days when homeowners may water their lawns. The state government announced in December — almost a year after the drought began — that users would be fined for increasing water consumption.

All this leaves city health officials battling the worst-ever outbreak of the disease just as Rousseff prepares a package of sweeping spending cuts. Some limit how many new resources go into controlling diseases such as dengue, said Duane Gubler, a professor in the emerging infectious-diseases program at Duke University-NUS Graduate Medical School in Singapore.

“Look at the size of Sao Paulo state: There’s no government in the world that has the resources to deal with that,” Gubler said in a phone interview. “You’re never going to effectively control the disease until you have the help of the people in their houses.”

PICTURES OF THE MONTH



Fogging to combat dengue is carried out in Rio de Janeiro.



Brazilian soldiers pour insecticide to fight against the *Aedes aegypti* mosquito (dengue fever vector) at a military facility in Realengo, northern Rio de Janeiro. Antonio Scorza/ Getty Images



VECTOR-BORNE DISEASES

Recent Local News

Fiji issues chikungunya alert as 1st imported case confirmed

Posted by Staff on May 6, 2015 /

Outbreak News today

The Ministry of Health and Medical Services advises the general public to focus efforts on reducing the risks of Chikungunya circulation in Fiji. This is after it received laboratory confirmation of an imported case of Chikungunya virus disease last week.

Chikungunya virus disease evolved and has progressively circulated amongst neighboring Pacific Island countries since 2014.

As Fiji's population is naïve to previous exposure to the Chikungunya virus (CHIKV), there is the likelihood of an explosive outbreak should the disease reach our shores.

The Ministry has been monitoring the Chikungunya situation in the region very closely in collaboration with WHO (World Health Organisation) and SPC (Secretariat of the Pacific Community). In addition it is also spearheading Chikungunya mitigation activities countrywide in efforts to reduce the risks of establishing the disease in Fiji.

Dengue and Chikungunya viruses are spread by the same mosquito vector. CHIKV is transmitted when a mosquito bites an infected individual and then discharges the virus in the bloodstream of a well individual during its next blood feed.

Although the disease is rarely fatal, the socioeconomic burden that comes with massive numbers missing work and school as a result of the disease is immense, as experienced in other Pacific Island countries that are currently dealing with the epidemic.

To reduce the mosquito density levels in the community, the Ministry encourages all individuals, government sectors and corporate entities in Fiji to work cohesively with the Ministry of Health in destroying mosquito breeding grounds via frequent organized cleanup campaigns.

With the confirmation of an imported case, the Ministry advises members of the public to be more vigilant of the disease and its manifestations and to present to the nearest health facility should they experience signs and symptoms

The Ministry will scale-up other components of its national mosquito vector control program and its disease surveillance activities in concerted efforts to prevent establishment and internal circulation of CHIKV in Fiji.

Vanuatu records first case of rare mosquito-borne zika virus

ABC News

28 Apr 2015 by Richard Ewart

Vanuatu health officials have for the first time confirmed cases of the rare mosquito-borne zika virus. Zika is the "milder brother" of dengue fever, head of the World Health Organisation (WHO) in Vanuatu Jacob Kool said.

The two illnesses share similar symptoms of fever, aching joints and rash.

Although there were no recorded deaths from zika, health officials warned it can cause "very explosive outbreaks".

Like dengue fever, there is no cure for the zika virus.

The WHO advises prevention through using mosquito nets, protective clothing and insect repellent, and removing breeding sites.

Dr Kool told ABC's Pacific Beat removing sites was "going to be very challenging" following the



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devastation caused by Cyclone Pam, which killed at least 11 people last month.

"Breeding sites could be any cracked coconut, for example, and there's a lot of debris like that — things that collect water where mosquitoes can breed," he said.

Chikungunya virus on the rise in Cook Islands

Radio New Zealand International

Originally aired on Dateline Pacific, Friday 1 May 2015



The Cook Islands ministry of health says the Chikungunya outbreak is on the rise and is likely to have not reached its peak yet.

The Cook Islands ministry of health says the Chikungunya outbreak is on the rise, and has not yet reached its peak.

The director of hospital health services Henry Tikaka says there have been about 324 recorded cases of the virus since late last year.

He told Mary Baines that most of them are on Rarotonga, but there are some cases on the outer islands.

HENRY TIKAKA: It has landed here in the Cook Islands and it's on the rise, like anywhere else when there's an outbreak of an infection.

MARY BAINES: So how many people have the virus now?

HT: At the moment, we've got about 300 plus cases, about 324. This began towards the end of last year. The thing was, you know, in spite of the fact that our neighbouring islands in the Pacific had the Chikungunya, the dengue fever and the zika virus, we have been kept free of it up until towards the end of last year.

MB: How concerned about the Chikungunya outbreak are you?

HT: Well in terms of numbers it's increasing just like the same progress in other Pacific countries. I mean it's a concern for the public. But I think what we're trying to do at the moment I am quite happy with the process of identifying cases and then with our community health services going out and spraying the residents of those affected.

MB: So you're working with the public to ensure that the outbreak doesn't get any worse?

HT: Definitely, because at the moment we are having an inspection of the island, and that's an opportunity to remind the community their contribution, other than ours to controlling the outbreak.

MB: So what are you asking the public to do, is it cleaning up and things like that?

HT: That's right, just cleaning up and getting rid of mosquito breeding places around the house and removing any water holding areas.

MB: There must be a bit of a strain on the hospital, is there?

HT: Well, yes, it does, any increase, there's always a strain on the hospital staff. But we are managing, that's not a problem at the moment.

MB: Do you think it will get worse before it gets better, or have we reached the peak?

HT: I don't think we have reached the peak yet of the outbreak, but I may be wrong. Time will tell. From the experience of our neighbouring countries, it could get worse. But with what we are putting in place we are just hoping we can control it and stopping it from getting worse.

ESR: 2014 Monthly Surveillance Report

Monthly Notifiable Disease Surveillance Report – Mar 15

Chikungunya fever: Four cases (3 confirmed and 1 under investigation) were notified in March 2015 compared to zero cases notified during the same month of the previous year. All cases reported overseas travel during the incubation period, to Samoa (2 cases), Kiribati and French Polynesia (1 case each).



Ross River virus infection: Two confirmed cases were notified in March 2015. The cases were both female and in the 40–49 years age group from Waikato and West Coast DHBs. Both cases were in Australia during the incubation period.

**WPRO: Pacific syndromic surveillance report
Week 17, ending 26 April, 2015**

Chikungunya outbreak is on-going in Cook Islands and Marshall Islands. Weekly number of cases in American Samoa, Kiribati and Samoa has reduced significantly.

Cook Islands reports 50 cases in the week to 26 April 2015. Mass clean-up campaign was conducted in Rarotonga on 27 April 2015.

There have been 276 cases in Marshall Islands as of 30 April since February 2015.

Dengue outbreak is occurring in the Macuata Province, Northern Health Division, Fiji. Dengue serotype-2 has been identified by the Institut Louis Malarde (ILM), French Polynesia. As of 29 April 2015, there have been 543 confirmed cases of which 437 (80%) are from the Northern Division. The number of cases is decreasing.

French Polynesia reports 20 cases in the week to 19 April 2015. Dengue serotype-1 has been identified.

Tonga dengue serotype-3 has been identified by Labplus, Auckland, New Zealand. There have been 7 dengue-like illness cases in the week to 26 April 2015.

Vanuatu reports its first case of *Zika virus* confirmed by the Institut Pasteur, New Caledonia. The case did not have any recent travel history.

An outbreak is ongoing in Solomon Islands. As of 19 April there have a total of 278 cases since February 2015. There were 17 cases reported in the week to 19 April 2015; 16 cases were from Honiara; 1 case was from Guadalcanal. Samples sent to ILM, French Polynesia at the beginning of the outbreak confirmed 5 cases positive for Zika virus.

USA

Battling mosquito-borne diseases in dry California

CNBC 22

Apr 2015 by Robert Ferris

California disease-control workers are wary of the warming weather, as well as ongoing drought conditions, and they are checking the air for mosquitoes.



Getty Images: California prepares itself for mosquito season as the drought persists.

The state's Department of Public Health recently announced that 2014 was a record year for potentially dangerous mosquito-borne West Nile virus cases, and some mosquito-control experts are concerned about the effect that warm weather and drought will have on mosquitos in 2015.



Given that the parasitic insects like to lay their eggs in water, it may be tempting to assume that California's severe, 4-year-old drought would make the mosquito problem better, not worse. But there are many aspects to the drought that are seen exacerbating the problem.

California's largest city, Los Angeles, has a vast network of storm drains that carry rainwater out to the ocean via the Los Angeles River. Over time, earthquakes have damaged some of these waterways, creating small interruptions where stagnant water collects.

The mosquito that lives there, *Culex quinquefasciatus*, remains active all year round, laying eggs in the pools. Wetter years produce regular storms that wash out the waterways. The last few years, which have been very dry, have not provided that safeguard.

Then there's the fact that people throughout California have taken steps to conserve or catch water. Other homeowners have stopped filling or maintaining their pools. Both cases can result in small pools of stagnant water, which in turn become an excellent home for mosquitoes.

Susanne Klueh of the Los Angeles County Vector Control District, which combats mosquitoes in order to prevent disease, said her group is trying to work with cities to strike a balance between water conservation efforts and mosquito control.

Predicting epidemics is impossible to do precisely—factors include the health of mosquito and bird populations, climate and water availability, and others—but people who work in the state's disease control groups are already seeing insects in the air.

Klueh said she and her colleagues are already observing population numbers slightly higher than their five-year average, even though the group had been chemically treating nests all winter.

"Right now, we are closer to what our numbers would be like during the summer," Klueh said.

Aside from the dry conditions, hotter summers and milder winters are also making the problem worse lately.

"We have a lot more infected mosquitoes in the area during some of these years that have very mild winters," said Joel Buettner, president of the Mosquito & Vector Control Association of California, an association of public agencies given the task of reducing mosquito populations and testing for viruses in animal and insect populations.

Data from other states show a similar correlation between warm winters and West Nile epidemics, including a recent study of epidemics in Dallas.

California had a mild winter, so vector control technicians had to start tackling active mosquito populations early in the season, Buettner said.

Hotter summers also make a difference. The warmer weather speeds up the lifecycles of the insects. They feed more, they metabolize the blood they feed on faster, and the viruses they carry replicate faster in their bodies. All of those factors can spread the disease more quickly.

A hot summer also can extend the mosquito season from two or three months to five months, which heightens chances of a human case. Two outbreaks in Saskatchewan, Canada, both occurred toward the tail end of a long and hot season.

West Nile virus is a disease that mostly affects birds, not humans. Mosquitos become carriers of the virus when they bite an infected bird. The insect can then transmit the disease to any human it bites after that. But mosquitos can pass the disease only from bird to bird or bird to human. Biting an infected human won't by itself make a mosquito into a carrier; only contact with an infected bird will.

That's why a sufficient number of susceptible birds is necessary to produce fast-spreading West Nile virus epidemics, according to Dr. Bill Reisen, a professor of veterinary medicine at UC Davis. But many of the affected birds have died off, and immunity has built up among those that remain.

"What we have found is that when you have epidemics that go to fruition, such as they did in Los Angeles or Orange County, usually the following year is a pretty light year, regardless of the heat and the drought or any everything else."

The areas most likely to suffer an outbreak in the coming years are those that went mostly



untouched in recent years, and since Los Angeles was hit hard in 2014, it may have an easier go of it this year.

"Areas like Bakersfield and some other Central Valley cities didn't have a huge year, so they might be at risk," Reisen said.

Americas

Brazil faces surge in number of dengue fever cases

Latin America & Caribbean

5 May 2015

Brazil has registered nearly 746,000 cases of the mosquito-borne disease dengue fever this year with nine states experiencing an epidemic, the health ministry has announced. Nationwide there have been 235% more cases from January to April than last year. At 368 cases per 100,000 residents it amounts to an epidemic by World Health Organisation standards, but officials say the outbreak is not nationwide.

Relaxed prevention and an increase in home water storage have been blamed.

More than half of the cases were in Sao Paulo.

The number of cases there - the most populous state - has tripled since last year.



The increase in home water tanks during the drought has created more egg-laying habitats

A total of 229 people have died of the disease.

Brazil has done much to counter the viral infection spread by mosquitoes, which causes severe abdominal pain, vomiting and circulatory system failure.

Health Minister Arthur Chioro argued that figures for last year were exceptionally low, whereas the outbreak in 2013 had been a lot worse than now.

He said better results last year had relaxed prevention in some regions.

The BBC's Julia Carneiro in Rio de Janeiro said another factor for the rise was this year's severe drought which led to more people storing water at home.

The mosquito that carries the dengue virus breeds in containers with clear, stagnant water.

There is no vaccine against dengue, but Brazilian authorities say they are hopeful of producing one within the next year.

Scientists are also testing ways to tackle the mosquitoes' capacity to breed, says our correspondent. In one such initiative last week, the city of Piracicaba released a first batch of up to a million mosquitoes - with a modified gene that keeps the males from reaching sexual maturity, causing the overall population to drop gradually.

Brazilian authorities believe the dengue outbreak has reached its peak as the weather is changing, becoming less favourable for the mosquitoes to spread the disease.

Dengue re-emerged in Brazil in 1981 after an absence of more than 20 years.

Over the next 30 years, seven million cases were reported.

The country reported 3.2 million cases of dengue and 800 deaths in the period 2009-2014.



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Europe

No malaria bearing mosquitoes identified in Malta and risk of infection is only through travel

Malta independent

5 May 2015

The government is monitoring the risk of proliferation of malaria bearing mosquitoes in view of climate change, but no such insects have been identified in Malta.

Answering a question put by opposition MP Mario Galea, Health Minister Konrad Mizzi said that the European Centre for Disease Control and Malta's Infectious Disease and Prevention Unit carried out a larger exercise in trying to identify any potential disease bearing insects in Malta, however, no risk was found and the particular mosquito (*Anopheles*) that transmits malaria (*Plasmodium*) has not been seen in Malta. He said that the only risk for Maltese people is travelling abroad where the mosquito can be found. He also said that some migrants arriving in Malta may have contracted the disease in their own country. However, the disease cannot be transmitted from person to person.

Mr Galea emphasised that he was not asking the question to cause alarm, but cited a Sky news report which quoted British scientists were worried about climate change causing the possible proliferation of the mosquito which transmits the disease. Mr Galea said the same scientific report showed that while malaria had been eradicated in Greece, outbreaks had been reported in rural areas.

Africa

Malaria cases fall 50 percent

The Zimbabwe Daily - Articles

1st May 2015 by Paidamoyo Chipunza

GOVERNMENT says the number of people infected with malaria since the beginning of the year fell by 50 percent compared to the same period last year. In an interview on Wednesday, national malaria manager in the Ministry of Health and Child Care Dr Joseph Mberikunashe said 157 182 cases of malaria have been recorded so far this year compared to 306 943 during the same period last year.

He said in 2013 a total of 256 909 cases were recorded throughout the Year. Dr Mberikunashe said there was also a decline in the number of malaria deaths from a high of 324 in 2014 to 226 this year. "We are beginning to see a decrease in the number of people being infected with malaria since 2012 and if we maintain the current trend without witnessing any outbreaks, we should be able to see a further drop to the current figures by year end," said Dr Mberikunashe.

He said while the country's Millennium Development Goals (MDGs) target was to reduce malaria burden by 75 percent by year end, the current trends show that the burden has so far been reduced by 71 percent.

He urged people to continue using available prevention methods like treated mosquito nets and seeking early treatment.

"At some point we had surpassed the target of reducing malaria burden in the country to about 81 percent, but those gains were eroded between 2013 and 2014 when we had several outbreaks particularly in Manicaland area," said Dr Mberikunashe.

He attributed the outbreaks in Manicaland to mosquitoes that have developed resistance to chemicals.

"The outbreaks occurred in areas which had been sprayed, but further investigations revealed that mosquitoes in those areas had become resistant to the chemicals which had been used," said Dr Mberikunashe.



WORLD OF MOSQUITO SCIENCE

Mosquito magnet? Blame it on your genes

The Southland Times

05/05/2015 by KAREN KAPLAN



Experiments show some people are genetically programmed to be attractive to mosquitoes.

Are you a mosquito magnet? If so, your genes may be to blame.

New research shows that if mosquitoes are attracted to the scent of a particular person, they are likely to be attracted to her twin's scent as well. On the flip side, if they are repelled by someone's odour, they're likely to find her twin repellent too.

Scientists tested 37 sets of twins who were willing to place their hands in a Y-shaped glass tube. Groups of 20 mosquitoes were released into the tube and given 30 seconds to assess the scents inside. Then a gate was opened, allowing them to fly toward the hands they preferred and away from the hands they disliked. (Although the mosquitoes could smell the volunteers' hands, they couldn't actually reach them.)

After running versions of the experiment 40 times with each set of twins, they found that the overlap in mosquito preference was about twice as high for identical twins (who share virtually all their DNA) as it was for fraternal twins (who share only half). That allowed them to calculate that 62 per cent to 83 per cent of a person's degree of mosquito attractiveness is determined by DNA, according to a study published in the journal *PLOS One*.

To put that into perspective, other studies have found that genes are about 80 per cent responsible for a person's height and 50 to 80 per cent responsible for a person's IQ.

Scientists have suspected for some time that those who find themselves playing the role of pincushion at barbecues and other outdoor gatherings have an unfortunate genetic inheritance.

They knew that biology played a role in either attracting or repelling mosquitoes. For instance, women who are pregnant are a much bigger draw than women who aren't. They also know that people who are infected with the malaria parasite are more attractive to mosquitoes during the window when the infection can be spread.

Previous studies have shown that mosquitoes are drawn to people (or not) on the basis of their [odour](#). Bacteria that live on skin play a role in producing body odour, but skin cells probably play a role too. If so, that might be controlled by genes.

So the researchers recruited 18 pairs of identical twins and 19 pairs of fraternal twins. All of them were women (so that the gender of the volunteers wouldn't skew the trial results) and all of them were post-menopausal (so that changes in their menstrual cycle wouldn't be a factor).

They also collected dozens of female *Aedes aegypti* mosquitoes, the species that spreads dengue fever. The mosquitoes were five to seven days old, and in their short lives all they had been able to eat was a glucose solution.

In some tests, the researchers compared the odour of one twin's hand against clean air. In other tests, they tested twin-versus-twin. And in others, both ends of the Y-shaped tube were pumped with clean air. The experimental results leave no doubt that some people are genetically programmed to be attractive to mosquitoes, and other lucky individuals have DNA that functions as a natural mosquito repellent. The researchers hope to use this knowledge to trick mosquitoes into thinking that everyone is in that second category.

"We could possibly develop a drug, a pill that you might take when you go on holiday that would cause your body to produce natural repellents and would minimise the need to actually put



repellents on your skin," said James Logan, a medical entomologist at the London School of Hygiene and Tropical Medicine and the study's senior author.

The next step for Logan and his team is to figure out which genes are responsible for mosquito magnetism, he said in a video released by his university. Genes involved in the major histocompatibility complex are believed to be involved in body odour, so that's one place to look, according to the study.

Once the genes are found, public health experts might be able to use that information to control mosquito-borne diseases, such as dengue and malaria, Logan said.

DID YOU KNOW?

End of Alaska winter heralds unfortunate arrival of mosquitoes

Alaska News Fairbanks Daily News-Miner

May 3, 2015 by Dorothy Chomicz

Alaska winters are long, dark and cold and the coming of summer is greeted with relief and delight. However, that delight is tempered by the arrival of another sign of summer - the mosquito.

Alaska has 34 species of mosquito, and the first of the season made their unwelcome presence known about a week ago. Large and lumbering, these snow mosquitoes, as they are known, are adults that spend the winter hibernating under the snow in loose tree bark or beneath leaves. Snow mosquitoes are able to overwinter because of a process called supercooling, in which their bodies produce a kind of natural antifreeze that keeps their cells from rupturing when temperatures fall below freezing.



Female snow mosquitoes emerge with an overriding thirst for blood, which they will need in order to nourish their eggs, according to Derik S. Sikes, curator of insects at the University of Alaska Fairbanks Museum of the North.

"Fertilized females overwinter with fertilized eggs. They suck some blood, lay their eggs and they die," Sikes said.

Mosquito populations are annual, which means the entire population dies each year and is replaced by a new generation, according to Sikes. The long-lived snow mosquitoes survive a year or slightly longer, while their smaller, faster cousins -- which emerge later in the

season -- have much shorter lives.

"The adult lifespan of Northern *Aedes* - the small ones - is probably not more than eight weeks for the adults," Sikes said. "They emerge, they mate, they lay eggs and die, and a new generation will emerge the same summer."

A warm winter and spring means they emerge sooner.

Some mosquitoes overwinter as eggs, deposited by the female in just about any place that water can accumulate. Alaska's many sloughs, bogs and marshes provide an ideal breeding ground for mosquitoes, much to the misery of human and animal alike. Mosquitoes and other biting insects can "bother" caribou calves and cause them to run until they're exhausted, which can end in death for the calf. Other mosquitoes are "bird specialists," according to Sikes.

"I once saw a falcon with over 30 mosquitoes on its face," Sikes said.

Sikes recently was asked to estimate the weight of all of the mosquitoes in Alaska, and the numbers are surprising. Based on an estimate of the amount of mosquitoes killed by spiders, Sikes said



every year Alaska is home to 17 trillion mosquitoes, weighing in at a whopping 96,191,666 pounds. This number seems large until you compare it to the combined weight of all the insects in Alaska, which is anywhere from 340 million to seven billion pounds, according to Sikes. Many of these non-mosquito insects — such as black flies, no-see-ums, horseflies, fleas, lice and ticks — also bite and feed on vertebrates. "Without a doubt, we are outnumbered," Sikes said.

MOSQUITO DISCUSSION

Outdoors notebook: Role of mosquitoes in grouse decline probed

May 5, 2015 by Bob Frye

Are you a believer that all things in nature are connected? If so, ruffed grouse may be in line for trouble.

The Pennsylvania Game Commission is exploring what role West Nile virus might be having in depressing ruffed grouse populations. No one believes the mosquito-borne illness is the primary cause behind a decline in grouse, commission wildlife veterinarian Justin Brown said. Loss of habitat is clearly No. 1, he said.



But, Brown added, grouse may be more susceptible to the disease than other species. That may explain why some hunters have noted grouse numbers being down even in areas with good habitat, he said.

The commission will try to collect eggs from wild Pennsylvania grouse, then raise them in a mosquito-proof environment to see how they fare.

"We're very interested in the result of this study," Brown said. "We think it has great value."

Meanwhile, to the detriment of grouse, mosquito

populations could conceivably increase in the future, as one of their chief predators is in trouble.

The U.S. Fish and Wildlife Service will list the northern long-eared bat as an endangered species as of May 30.

Populations of the mosquito-eating bat have declined by up to 99 percent because of an infection known as white-nose syndrome. The listing is meant to offer them some protection, primarily during the summer "pup-rearing" season, the service said.

But the listing comes with some caveats.

Greg Turner, bat biologist for the commission, said that under what's known as the federal "4(d)" rule, there will be some exceptions not typically allowed. Timbering operations will be allowed to continue, bats can be removed from homes in nuisance situations, and those with permits can continue to capture and handle bats, for instance, he added.

The U.S. Fish and Wildlife Service said the exceptions ensure landowners are not "unduly burdened" by regulations that do nothing to further protect the bats.

But at least one organization, the Center for Biological Diversity, has filed lawsuits suggesting the protections don't go far enough, Turner said.