



BORDER HEALTH NEWSLETTER – February 2015

WELCOME!

The summer is still to the full. For some areas this means high numbers of mosquitoes including Northland, Auckland and the Midcentral region. A sample of more than 3000 adult *Aedes notoscriptus* says everything. Other areas, where it has been quite dry, might register a decrease of numbers. The number of outbreaks of arboviruses are similarly crazy: Chikungunya in the Pacifics, and Dengue in Brazil, Vietnam, Borneo and Ghana. Scientists do not stand still and try to find new ways to prevent infections and Border Health Control is significant as ever.

SAMPLES

During February 913 samples were collected by staff from 12 DHBs with 379 positive.

We had a lower number of *Ae. antipodeus* adults and *Ae. australis* larvae compared to last month.

A huge amount of adult *Ae. notoscriptus* have been caught, but they were almost all from one sample and it is good to see so many *Coquettidia iracunda*.

In February there were huge numbers, both adults and larvae, of *Culex quinquefasciatus*. Last year at same time we had similar high numbers for the adults but much lower numbers for the larvae. More than seven thousand larvae this month is impressive. The majority of which were younger larval instars.

Species	Adults		Larvae	
	Feb 2015	Feb 2014	Feb 2015	Feb 2014
New Zealand Mozzies				
<i>Aedes antipodeus</i> (winter mosquito)	7	2	Nil	Nil
<i>Ae. australis</i> (saltwater mosquito)	Nil	Nil	2	19
<i>Ae. notoscriptus</i> (striped mosquito)	3512	345	2653	1462
<i>Coq. iracunda</i>	108	32	Nil	Nil
<i>Coq. tenuipalpis</i>	2	1	Nil	Nil
<i>Culex astilae</i>	Nil	Nil	4	Nil
<i>Cx pervigilans</i> (vigilant mosquito)	167	18	4360	1687
<i>Cx. quinquefasciatus</i> (southern house mosquito)	1350	1068	7417	1258
<i>Opifex fuscus</i> (saltpool mosquito)	Nil	Nil	42	84
Total	5146	1209	14478	4848

INCURSIONS/INTERCEPTIONS

We have had 7 Interceptions during February:

01.02.2015: Two live adult mosquitoes were found at Auckland Airport, one at the MPI Risk assessment desk, the other at the MPI Quarantine search benches. Both were identified as *Cx. quinquefasciatus*, one male and one female.

02.02.2015: One mosquito found alive at the baggage tracing area carousel, arrived headless at the lab, but was in good condition otherwise and could be identified as *Cx. quinquefasciatus*.

18.02.2015: MPI found a live mosquito at AIAL attracted to cheese. It was identified as a male *Cx. quinquefasciatus*.



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- 20.2.2015 In the mail room at the international mail clearance area 3 mosquitoes were found, 2 males and one female, all three *Cx. quinquefasciatus*
- 22.2. 2015 An exotic mosquito was found alive at Menzies aviation Auckland airport. It was identified and confirmed as *Aedes vexans*, a night biting floodwater breeder with high significance for public health.
- 27.2.2015 Another female *Cx. quinquefasciatus* was found at the international mail room Auckland airport.
- 28.02.2015 A non mosquito and a *Cx. quinquefasciatus* was found in a cargo of fresh flowers from Malaysia at the Auckland airport.

NEWS OF THE MONTH



The All Blacks are continuing to monitor the mosquito-borne disease in Samoa ahead of their test in Apia in July. Samoa prime minister and head of the Samoan Rugby Union Tuilaepa Sailele Malielegaoi at a press conference last year when the historic test against the All Blacks, which will be played in Apia, was announced.
Photos: Getty Images

New Zealand Rugby says mosquito-transmitted disease in Samoa won't threaten Apia test match

Stuff LIAM NAPIER February 21 2015

New Zealand Rugby is monitoring a mosquito-transmitted disease that has infected thousands in Samoa but remain confident it will not threaten the historic All Blacks test.

While on the decline, according to the Auckland Regional Public Health Service, more than 4,400 cases of the mosquito-spread viral disease chikungunya, which carries similar symptoms to dengue fever, have been reported in Samoa over the last six months.

Of the estimated 69,000 cases in French Polynesia, nine people have died from the illness.

Travelers are merely advised to protect themselves from mosquito bites, through clothing or repellent.

NZR chief executive Steve Tew was relaxed when approached yesterday, but indicated the outbreak would be continually monitored.

"New Zealand Foreign Affairs are still sending Kiwis up there without any advisory and the precautions are similar to malaria – to cover up," Tew said. "It is on the decline, so we're not treating it as a major concern right now. We'll keep an eye on it."

NZR operational staff, along with Sky Television technicians, also returned this week from a two-day stay in Apia, where the main focus was assessing the state of the pitch where the All Blacks will



meet Samoa on July 5.

The respective unions appear to have reached an agreement where a problematic drainage system, which has been built in preparation for the Youth Commonwealth Games, will be covered in some way to prevent it encroaching on the in-goal and sidelines.

"They had a good look around and we've now got a handle on what's good and what needs a bit of effort," Tew said. "There's no deal breakers, but they'll have to do some remedial work around this drain, that's for sure. Our operations people think that's quite achievable."

All Blacks manager Darren Shand is expected to travel to Apia in around three weeks and check on medical facilities, accommodation and transportation.

In recent weeks World Rugby and the Samoan Rugby Union have jointly moved to input wide sweeping reforms which resulted in the sudden resignations of the chief executive and general manager of high performance.

Former All Blacks midfielder Alama Ileremia has stepped up to accept the high performance role – all of which should help avoid possible strike action from the Samoan players.

"They've got some good people who have taken over key roles," Tew said. "That hasn't done any harm."

Mosquito-borne disease remains on All Blacks' radar

NZ Herald Feb 27, 2015

The All Blacks are continuing to monitor the mosquito-borne disease in Samoa ahead of their test in Apia in July. New Zealand Rugby chief executive Steve Tew today described the disease as high on the "risk radar" and "obviously a concern" ahead of the All Blacks' defence of their World Cup, which starts in September.

"We would not be wanting to send World Cup athletes into an area where they would be at significant risk of catching something that would debilitate them prior to the World Cup," Tew said. "But we are reliant on the government and other agencies to give us the right advice and as of now there are no travel warnings for Samoa. Hopefully that will sort itself out but we'll keep a very close watch on it."

Tew said there was no cut-off point in terms of when a decision would be made to go or not go. The Auckland Regional Public Health Service has said it had seen a marked increase in the number of people returning from the Pacific Islands with dengue fever or chikungunya. Both viral illnesses are transmitted by mosquitoes and have similar symptoms. Chikungunya can see a person bedridden for more than a week, with conjunctivitis, nausea, vomiting, and joint pain being the key symptoms.

Up to 4289 cases of chikungunya were reported in Samoa over the past year.

"We will be monitoring that right up until the day we leave, frankly, and it's the sort of thing that changes really quickly," Tew said. "We are doing some more research into the risk of actually contracting it. The simplest method of not putting yourself at risk is making sure you don't get bitten by a mosquito. "It's obviously a concern. We'll keep a close watch on it, we're not going to put our guys under any undue risk."

Tew said New Zealand Rugby's operations crew investigated the Apia ground last week, with a concrete drain on the inside of the running track an issue that had to be resolved. "There will need to be an acceptable and safe method of covering that concrete drain up before we play there. We don't think it's insurmountable and they're working on solutions as we speak."



PICTURE OF THE MONTH



A man holds a mosquito net before placing it over a water container on the roof of his house in Sao Paulo on Feb. 11. PHOTO: REUTERS

VECTOR-BORNE DISEASES

Recent Local News

18 confirmed chikungunya cases in Cooks

Radio NZ

18 cases of the mosquito-borne chikungunya disease have been confirmed in the Cook Islands.

The cases included two travellers returning from French Polynesia and one from Samoa.

The Cook Islands News reports all confirmed cases involved Rarotonga residents.

Public Health Officials are continuing its risk assessment campaign, and is carrying out aerial spraying to kill adult mosquitoes at the homes of those who have been confirmed with the disease.

The department is also urging travellers to take precautionary measures if travelling within the Pacific region as outbreaks of chikungunya are continuing in American Samoa, Samoa, French Polynesia, New Caledonia and Kiribati.

Symptoms of chikungunya include fever and joint pains, while many victims also suffer headache, muscle pain, nausea, fatigue and rash.

Chikungunya update for the Americas and the Pacific Islands

Outbreak News Today Robert Herriman March 1, 2015

The chikungunya epidemic in the Western hemisphere has increased by 3,000 cases during the past week with the new tally at 1,247,000 since the first autochthonous cases were reported on the Caribbean island of St. Martin in December 2013. 183 fatalities have been reported.

Countries reporting an largest increase in cases include Puerto Rico (1,700) and El Salvador (1,383). The Dominican Republic and Colombia continues to have reported the most cumulative cases to date with 539,183 and 177,187 cases, respectively.

In 2015 to date, the United States has seen 43 imported chikungunya cases from 13 states as of Feb. 24. During 2015, no locally-transmitted cases have been reported from U.S. states.

In the Pacific, the French Polynesia outbreak is at more than 69,000 estimated cases since 10



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October 2014, as of 25 January 2015. 728 hospitalizations, 48 severe cases, 9 fatal cases have been documented. Officials say the outbreak is decreasing.

Elsewhere in the Pacific Islands, Samoa has reported 4,431 cases since 21 July 2014 as the outbreak winds down.

Chikungunya outbreaks are increasing in New Caledonia (50 cases), the Cook Islands (83) and Kiribati (36).

Chikungunya is a viral disease transmitted by the bite of infected mosquitoes such as *Aedes aegypti* and *Aedes albopictus*. It can cause high fever, joint and muscle pain, and headache. Chikungunya does not often result in death, but the joint pain may last for months or years and may become a cause of chronic pain and disability.

There is no specific treatment for chikungunya infection, nor any vaccine to prevent it. Pending the development of a new vaccine, the only effective means of prevention is to protect individuals against mosquito bites.

WPRO: Pacific syndromic surveillance report

Week 8, ending 22 February, 2015

Chikungunya outbreaks are on-going in Cook Islands, Kiribati, New Caledonia. Outbreaks in American Samoa, French Polynesia and Samoa are waning.

For the week ending 20 February 2015 Kiribati reported 8616 suspected cases since 23 January 2015. Age range: 0-82 years; median age 24 years; Female 53% Male 47%.

Cook Islands- 119 cases were reported since November 2014 to 24 February 2015.

Niue: Laboratory confirmation received from Lab PLUS NZ in a fatal case that had previously travelled to Samoa. Information regarding this case was highlighted on PacNet on 5 February 2015.

Dengue outbreaks are occurring in Fiji (dengue serotype-2) and Tonga.

French Polynesia. There were 10 confirmed cases for week ending 8 February 2015. Dengue serotype-1 has been identified. The weekly number of cases is decreasing.

Tonga reports 105 dengue-like illness cases for week ending 22 February 2015. Dengue serotype 3 has been identified. There have been four imported dengue cases (ELISA Ig M positive) identified in New Zealand in returned travellers from Tonga for week ending 8 February 2015. For further details regarding the Tonga situation, please refer to Dr Ofa Tukia's PacNet post on 20 February 2015

ESR: 2014 Monthly Surveillance Report

Monthly Notifiable Disease Surveillance Report - Jan 2015

Chikungunya fever: 21 cases of chikungunya fever (13 confirmed, 2 probable and 6 under investigation) were notified in January 2015. All cases reported overseas travel during the incubation period to Samoa (18 cases), Fiji, French Polynesia, India, and Tokelau (1 case each). One case reported travel to more than one country.

Dengue fever: 32 cases of dengue fever (26 confirmed, 1 probable, and 5 under investigation) were notified in January 2015 compared to 22 cases notified in the same month of the previous year. After further investigation, one case has since been found not to meet the case criteria. The travel history was recorded for 96.8% (30/31) of cases. The countries most commonly visited were Tonga (15 cases) and Indonesia (5 cases). Some cases reported travel to more than one country.



Americas

Drought-Stricken São Paulo Battles Dengue Fever Outbreak Hundreds Infected With Mosquito-Borne Virus

ROGERIO JELMAYER and LORETTA CHAO March 3, 2015

SÃO PAULO, Brazil—Inhabitants of this megacity, suffering through the worst drought in decades, have unwittingly contributed to an outbreak of dengue fever by storing scarce water in open containers.

The tropical mosquito-borne virus, which often results in high fever, intense muscle pain and convulsions, has killed at least 17 people in São Paulo state in the first six weeks of 2015. That's up from just three deaths through mid-February of 2014, according to national health officials. Suspected cases have surged tenfold to 51,849 over the same period.

Dengue is a persistent problem in Brazil, particularly during the peak of the rainy season, which is January and February in the nation's populous southeast. But health officials blame human behavior for this year's surge. While drought-ravaged São Paulo has yet to declare official water rationing, the main water utility has reduced pressure in the pipes to force conservation, a strategy that has cut off running water to millions of customers for hours, even days at a stretch. Residents have responded by hoarding water in open buckets, watering cans and other makeshift containers. Paradoxically, they've created a water-borne paradise for mosquitoes to breed in the midst of an epic drought.

"It's worrying now because it's hard to control how people store water," said Jose Gomes Temporao, former health minister and executive director of South American Institute of Government in Health. "This creates a risk not just for dengue but for chikungunya," another mosquito-borne virus that cause fever, rashes and joint pains that can last for months, even years.

The outbreak has sparked panic in the city of São Paulo, where 563 cases of the disease have been confirmed through mid-February, a 163% increase from the same period a year ago. Health officials have dispatched some 2,500 agents to go door-to-door and educate residents on prevention measures, such as filling potted plants with sand, keeping containers dry and swimming pools covered.

Local media have featured photos of pro soccer players being doused with bug spray before venturing into matches. Residents are snapping up repellent, mosquito netting, insect zappers and foggers in a bid to keep the mosquitoes from biting.

At Grupo Pão de Açúcar, Brazil's largest retailer, sales of insecticides increased 11% in January and February, versus the same period of 2014, a spokeswoman said. Small merchants, too, are reporting strong demand for drought-related wares. Sales of bottled water and repellent are up 20% over the past three months, according to Fabio Hideki, who owns a small market near São Paulo's city center. He said particularly hot sellers are cartridges of insecticide that plug into a wall socket that can last for up to 45 days.

"People are afraid of dengue," he said. "They are very concerned about mosquitoes."

Conditions are even worse in some parts of São Paulo state. More than 1,600 cases have been reported in recent days in Soracaba, a city of about 600,000 residents located 60 miles west of São Paulo, leading officials there to declare it an "epidemic."

Soracaba resident Tania Pascole said she and her 19-year-old son are slathering on bug spray to ward off dengue-carrying mosquitoes.

"Everyone has a friend or a family member who's gotten the disease," the 44-year-old secretary said. "We've always been careful, but this year we're taking extra precautions. We apply repellent basically all day. Thank God, my son and I haven't been infected."

Other families haven't been so fortunate. Renata Ferreira Correa Fabri lost her 45-year-old sister to the disease on Saturday.

A resident of Limeira, about 90 miles northwest of São Paulo, Ms. Fabri said her sister, Paula Ferreira Correa Ponte, went to the hospital last week complaining of body aches. Doctors suspected



Ms. Ponte had dengue and sent her home under orders to hydrate and rest. But her condition worsened, Ms. Fabri said, and her sister was readmitted to the hospital, where she died of cardiac arrest.

The grief-stricken family is now scrambling to figure out how to care for Paula's 5-year-old son, who is now an orphan.

Asia

Dengue fever spreads to 38 localities in Vietnam, killing 3

TUOI TRE NEWS 03/04/2015

Dengue fever, a mosquito-borne tropical disease caused by the dengue virus, has affected over 5,200 patients so far this year in 38 provinces and cities in Vietnam and killed three of them, according to the Ministry of Health.



The deaths were recorded in the southern provinces of Dong Nai and Long An, the ministry's Preventive Health Department said.

Compared to the same period last year, the number of patients increased by 27 percent and the death toll rose by two instances.

In February alone, 3,640 people were infected with dengue fever, the department said, adding that the disease is spreading mainly in the southern region.

In this file photo, children with dengue fever are seen being treated at the Khanh Hoa General Hospital in the south-central Vietnamese province of Khanh Hoa in 2013.

Tuoi Tre

Dr. Phan Trong Lan, head of the Ho Chi Minh City Pasteur Institute, said the number of dengue cases continuously soared in late 2014, primarily in three southern localities: Binh Duong and Dong Nai Provinces and Ho Chi Minh City.

Dr. Nguyen Minh Tien, head of the Emergency Department of the Pediatrics Hospital 1 in Ho Chi Minh City, on Tuesday warned that a number of patients have been hospitalized late, so they are in more serious condition than those admitted to the hospital earlier.

Dr. Tien advised parents to pay more attention to signs of dengue in their children so that they can be taken to the hospital timely.

Dengue fever is an infectious disease that is transmitted by the bite of an Aedes mosquito infected with a dengue virus, according to the World Health Organization.

The mosquito becomes infected when it bites a person with the dengue virus in their blood, the organization says.

It cannot be spread directly from one person to another person, it notes.

Symptoms include fever, headache, muscle and joint pains, and a characteristic skin rash that is similar to measles.

There is no vaccine against dengue, so the preventive measure is mainly to kill mosquitoes that transmit the virus, the health ministry said.

People should closely cover all containers of water to prevent mosquitoes from entering them and laying eggs, health experts advised.



Carry out fogging before dengue outbreak

Borneo Post online Posted on March 5, 2015, Thursday

KOTA KINABALU: The State Health Department has been urged to proactive in combating dengue in the state capital.

Api Api assemblywoman Christina Liew said the department should proceed to carry out fogging in high risk areas and not wait until an outbreak of dengue fever.

Commenting on the statement by Sabah Health Director Dr Christina Rundi that Kota Kinabalu recorded the most number of dengue cases in Sabah at 361, Liew said the director did not elaborate on what kind of actions have been taken by the department or other relevant authorities when more than two cases happened in one particular area.

"In fact, in any areas which pose potential danger of dengue fever, due to dirty environment or any other reasons, the Health Department should start fogging water-based insecticides in these areas and not wait until there is an outbreak of dengue fever," the PKR Sabah deputy liaison chief said.

Liew said a team from her office had visited some of the areas in and around the state capital in the last two months and found that many of the back lanes of shop lots were filthy with clogged drains and stagnant water.

These are potential breeding grounds for the *Aedes* mosquitoes, she said, adding that they have raised the matter with the City Hall.

"We will return to visit some of these areas and hopefully the problem areas as pointed out by the residents in the respective areas have been cleaned up.

"We will also visit some of the areas where dengue outbreak has been reported, including Kampung Air and Bandaran Berjaya.

"We will also be visiting housing areas, especially those with open spaces and drainage systems.

"We will inform the Health Department immediately about areas having potential *Aedes* breeding ground and request the department to conduct fogging in these areas," she added.

Africa

The hidden burden of dengue fever in West Africa - University of Miami researcher leads a team of scientists in a study that finds dengue unrecognized and obscured by malaria in Ghana

Eurekalert 2-MAR-2015

CORAL GABLES, Fla. (March 2, 2015) - Misdiagnosis of febrile illnesses as malaria is a continuing problem in Africa. A new study shows that in Ghana, dengue fever is circulating in urban areas and going undiagnosed. The authors of the study hope to use the findings to launch a widespread initiative to better understand acute undifferentiated febrile illnesses in West Africa.

"We believe dengue to be one of many diseases with classic fever and headache symptoms that are currently being misdiagnosed as malaria on a massive scale," said Justin Stoler, assistant professor of Geography in the University of Miami (UM) College of Arts and Sciences, and lead investigator of the study.

"The over-prescribing of anti-malarials puts evolutionary pressure on the malaria parasite that risks hastening its resistance to artemisinin-based combination therapy--the frontline drugs used to treat malaria in Africa," Stoler said. "Such resistance is already spreading across Southeast Asia."

Dengue is not contagious. The disease is transmitted from the bite of an infected mosquito. The study recently published in *The American Journal of Tropical Medicine and Hygiene* is the first to demonstrate evidence of local transmission of dengue virus in Ghana, rather than exposure being limited to cases brought back from other countries.

Due to limited resources, many healthcare facilities in Ghana use only a clinical examination to



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presumptively diagnose malaria. However, a definitive diagnosis requires a laboratory test. In 2013, around 45 percent of all child outpatients, and 40 percent of all outpatients, received a clinical diagnosis of malaria after seeking treatment for febrile illness at health care facilities in Ghana's capital city, Accra. Yet, less than one third of all national malaria diagnoses were confirmed by blood tests.

Interestingly, the researchers looked for possible exposure to dengue in archived blood samples from children ages 2-14 years old who had been diagnosed with laboratory-confirmed malaria. The samples were collected at local health facilities from 2011 to 2014 in three ecological zones of Ghana: Navrongo, Kintampo, and Accra.

The findings show that of 218 children with laboratory-confirmed malaria, 21.6 percent tested positive for long-lasting dengue IgG antibodies, which imply any lifetime exposure to dengue virus, while 3.2 percent tested positive for short-term dengue IgM antibodies, which indicate recent exposure, generally in the previous 90 days.

"If these children who were confirmed to be malaria-positive also tested positive for dengue exposure, imagine what the incidence of dengue could be in unconfirmed malaria cases," Stoler said. "If these patterns hold in Ghana, then the misdiagnosis burden in other large urban areas in Africa could approach one-third of all outpatient visits, given the large volume of presumed malaria cases in health care facilities"

The hope for better health outcomes in the region lies in getting the diagnosis right.

"As the price and accuracy of rapid diagnostic tests and other diagnostic instruments improve, I think we have a chance to really make a difference in clinical settings facing huge burdens of acute undifferentiated febrile infections that I believe are being misdiagnosed," said Stoler, who also holds a position in the Department of Public Health Sciences at the UM Miller School of Medicine.

MOSQUITO WORLD OF SCIENCE

Float like a mosquito, sting like a ... mosquito

Researchers evaluate mosquitoes' ability to float on water in order to potentially design aquatic robots

AMERICAN INSTITUTE OF PHYSICS 3-MAR-2015

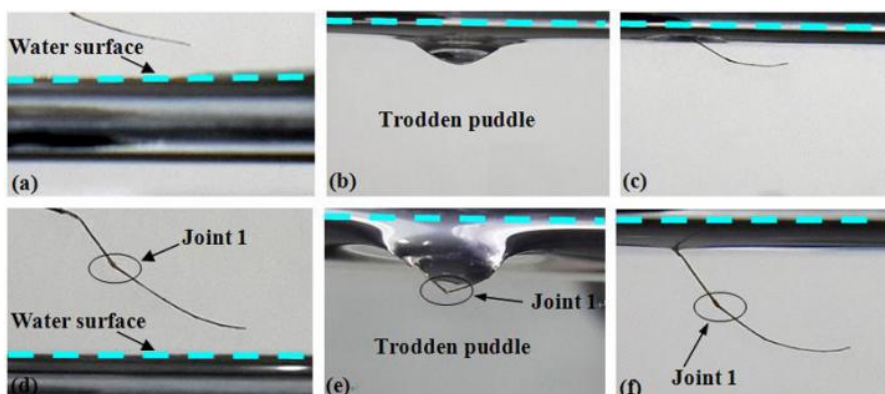


IMAGE: (A-C) A SEQUENCE OF THE TERMINAL HALF OF A TARSUS PROGRESSIVELY DEPRESSING THE WATER SURFACE IS SHOWN. (D-F) A SEQUENCE OF THE WHOLE HIND LEG PROGRESSIVELY DEPRESSING THE WATER SURFACE.

CREDIT: JIANLIN LIU/CHINA UNIVERSITY OF PETROLEUM WASHINGTON, D.C., March 3, 2015

Small semi-aqueous arthropods, such as mosquitoes and water striders, are free to go about their waterborne business thanks to their unique leg-based adaptations, which repel water and allow them to float freely on the surface.

By examining the forces that the segments of mosquito legs generate against a water surface, researchers at the China University of Petroleum (Huadong) and Liaoning University of Technology



have unraveled the mechanical logic that allows the mosquitoes to walk on water, which may help in the design of biomimetic structures, such as aquatic robots and small boats.

"The current analyses deepen our understanding of the mechanisms of water-walking of these aquatic insects," said Jianlin Liu, a professor in the Department of Engineering Mechanics at the China University of Petroleum. They describe their current research in the journal *AIP Advances*, from AIP Publishing.

Mosquitoes land on still bodies of water to lay their eggs just under the surface, where the embryos will hatch and develop into a pupa, eventually emerging from the water as a mature adult to continue the cycle.

A mosquito leg consists of three segments coated in grid-like, microscopic hydrophobic scales: a stiff femur juts out from the insect's abdomen and connects at a joint to an equally stiff tibia, which branches into a long, flexible tarsus. Previous measurements of the ability of water surfaces to support insects had largely ignored the tarsus, however, focusing instead on whole legs.

The researchers measured the buoyant force produced by the tarsus by adhering a mosquito leg to a steel needle, which was attached to an indenter column and microsensor. This in-situ setup allowed them to adjust the angle and force between the leg and the water's surface, while taking readings with an optical microscope and digital camera.

Liu and his colleagues found that the insect's ability to float on water - generating an upward force of twenty times its own body weight with its six legs - is owed entirely to the tarsus's buoyant horizontal contact with the surface.

"This finding overthrows the classical viewpoint that the longer the mosquito leg, the more efficiently it produces buoyant force," Liu said.

By reducing the total surface area of the leg in contact with water, the adhesive force of the water on the insect is greatly reduced, which assists in takeoff.

The structural ability of the tarsus to achieve such a large supporting force per unit length, however, remains an ongoing research endeavor for the team. Future work for Liu and his colleagues involves studying the microstructures, wet adhesive forces and dynamic behavior of mosquito legs.

MOSQUITO WORLD-DISCUSSION

A Cow Cologne That Can Prevent Malaria

TIME NEWSFEED ANIMALS Bijan Stephen June 7, 2014 Moocci

As the days lengthen and temperatures rise and spring gives way to summer, the harbingers of hazy, popsicle-melt days and warm, lazy nights have reappeared—the smells of freshly cut grass, asphalt after rain; and, less pleasantly, flies and spiders and roaches and fire ants and mosquitoes.

Of all the unpleasant things about summer—sweating through your clothes, the smell of things baking in the heat that shouldn't be, swimming pools filled with screaming children—mosquitos are probably the worst. They're the world's most dangerous animals, carrying some of the most deadly diseases known to man: Malaria, yellow fever, dengue, West Nile and encephalitis, among others.

And on top of that, those bites really itch!

Luckily, a few good scientists are using a novel approach to tackle the problem — by using cows. Researchers at a California tech company are experimenting with spraying human-scented cologne on cattle, thereby ensuring that it's heifers bitten and not humans. There doesn't seem to be a downside: Cows can't contract human malaria from mosquito bites, and the spray (a "shampoo-y goo," according to Smithsonian) lasts for several weeks. Moreover, the human-smelling cows can also be treated with insecticide, so that any mosquito that tries to Dracula winds up dead.

It's a potentially brilliant solution—part of a more comprehensive malaria prevention strategy, at least—that could ensure the protection of the 3.4 billion people around the world at risk for malaria. And hey, Bill Gates believes in it too: His foundation awarded the researchers \$100,000 to continue developing the technology.



DID YOU KNOW?

Measles vaccine in modified form also effective against Chikungunya virus



A modified, conventional measles vaccine has the potential to act against the Chikungunya virus. This is the result of a study at the University Clinic for Clinical Pharmacology of the MedUni Wien (Medical University of Vienna), which has now been published in the top journal *The Lancet Infectious Diseases*. Up until now, there has been no effective vaccine against the Chikungunya virus and the associated feverish illness, which can prove lethal, and is particularly prevalent in Latin America and the Caribbean.

Measles vaccine in modified form also effective against Chikungunya virus

Scientists at the MedUni Wien led by Bernd Jilma, and in cooperation with the Institut Pasteur in Paris, the Walter Reed Army Institute of Research in the USA, and the Vienna biotechnology company Themis Bioscience GmbH, have succeeded in introducing tiny surface particles of the Chikungunya virus into the human body using the measles vaccine and proving its effectiveness.

Jilma: "The modified measles virus is planted into people in Trojan horse style, and there it produces the corresponding surface particle of the Chikungunya virus. This occurs to such a low concentration that no symptoms of the disease appear. However, the Chikungunya particles are still able to stimulate the lymphatic system and to trigger the antibody production against the virus. These antibodies are then available at any time should an infection with the Chikungunya virus really occur. As a result, the disease cannot break out." The technology itself was developed at the Institut Pasteur, implemented by Themis Bioscience GmbH and has now been successfully clinically tested at the MedUni Wien using 42 test persons.

A further positive effect: The modified virus also strengthens immunity against the classic measles infection. "If the vaccine is changed accordingly, it could also be effective against dengue fever or other viruses", according to Jilma. The findings must now be clinically evaluated in Phase II and Phase III studies; utilisation in practice could be feasible in three to five years, according to the scientists. An active immunisation is possible using a one or two-part vaccination.

There were 20 cases of Chikungunya fever in Austria in the past year. In the Caribbean, Central and South America and on the Pacific Islands, but also in the USA, the virus, which is transmitted via mosquitoes has triggered an epidemic, probably since 2013. According to current information from the pan-American health organisation OPS, more than 1.2 million people have become ill with the virus since then, whereby the Caribbean region is particularly affected by it.

Amongst other things, the Chikungunya fever causes muscular and severe joint pain, which can remain for months, and high fever. Furthermore, those affected often suffer from nausea and vomiting. If the patients have a healthy immune system, the disease normally passes without any severe complications. For weak patients, it can however be lethal. Up until now, there is neither an effective medication nor a vaccine against this disease. People who travel to affected countries are urgently advised to protect themselves against mosquito bites.