News from Academia

A Compendium of New Scientific Publications Relevant to the Pest Management Industry

Compiled by Stephen L. Doggett and David Lilly

THAILAND: SURVEY OF BORRELIA FROM RODENTS AND TICKS

Borrelia are a type of bacteria with several species from this genus that cause disease in humans. Most are transmitted by ticks, however the bacteria has not been well studied in Thailand. A survey of ticks and rodents using molecular means of testing found a number of species of *Borrelia* including B. miyamotoi, *B. yangtzensis* and B. *theileri*/B. *lonestari*. The study identified several species of this important genus for the first time from Thailand and showed that previously unrecognised human pathogens occur in the nation and pose a threat to human health.

Source: *Journal of Medical Entomology* (25/Dec/2020), https://academic.oup.com/jme/advance-article/doi/10.1093/jme/tjaa279/6048521

MOSQUITOES IN ASIA AND AMERICA GREATER RISK FOR HUMAN DISEASE

Aedes aegypti, the mosquito that transmits dengue, also spreads a range of other mosquito-borne diseases including Zika virus. What is curious is that although *Aedes aegypti* originates from Africa, outbreaks of Zika virus tend not to occur in that continent. Researchers have found that the African strain of the mosquito is less efficient at transmitting the virus. When the mosquito spread around the world, it became adapted to the urban environment and preferred humans as a blood source. In the process it became a more efficient vector of viruses.

Source: *Science* (20/Sep/2020), https://science.sciencemag.org/content/370/6519/991?utm_source=STAT%20Newsletters&utm_campaign=7b63a54aa0-MR_COPY_01&utm_medium=email&utm_term=0_8cab1d7961-7b63a54aa0-150521553

CLIMATE CHANGE MAY MAKE HUMANS MORE ATTRACTIVE TO TICKS

Around the world tick-borne diseases are on the rise. A group of researchers from the University of California posed the question, what will happen with rising temperatures due to climate change in terms of the attractiveness of ticks to humans. What they found was quite astonishing; when the temperature was raised from 23C to 38C, the brown dog tick, *Rhipicephalus sanguineus*, was 2.5 times more likely to be attracted to humans over dogs. Currently the tick in southern areas of the US and expected to spread north with climate change. These findings were presented at the annual conference of the American Society of Tropical Medicine and Hygiene.

Source: The Guardian (17/Nov/2020), www.theguardian.com/science/2020/nov/16/study-finds-ticks-choose-humans-over-dogs-when-temperature-rises

NEW APP TO IDENTIFY MOSQUITOES FROM BUZZ

A researcher at the University of California has developed an app (Abuzz) that can identify a mosquito from the sound of its wings – the source of the annoying buzzzzz at night. The app can be used to identify the presence of dangerous mosquitoes such as *Aedes aegypti*. It may also prove to be useful in surveillance programs where traps are commonly used to collect and identify the mosquitoes within an area. It is expected that the app will be available in the next couple of months.

Source: *VOA* (16/Nov/2020), www.voanews.com/science-health/new-app-identifies-mosquitoes-buzzing-sound

ARTIFICIAL SWEETENERS FOR INSECT CONTROL

Prof. Chow-Yang Lee, who was feature as the Icon in last month's issue of the *FAOPMA Magazine*, recently published a review of the use of artificial sweeteners for insect control. The great advantage of these products is that they have low human toxicity, but are highly efficacious at killing insects, and many insects are willing to feed on them. The use of artificial sweeteners as a novel biorational control agent is discussed.

Source: *Journal of Economic Entomology* (6/Nov/2020), https://academic.oup.com/jee/advance-article-abstract/doi/10.1093/jee/toaa244/5957814?redirectedFrom=fulltext

HOW DO ANTS PROTECT THEMSELVES FROM PATHOGENS? THEY DRINK THEIR OWN BOTTOM ACID!

Ants produce formic acid for both defence against predators and to subdue their prey. However, recently it was found that after eating and drinking, ants would often clean the glands that produce the formic acid, which are located on the abdomen. In the process they consume some of the formic acid, which makes the gut of the ant very acidic. This allows for the growth of favourable bacteria, while inhibiting others. Thus through drinking their own bottom juices, ants can live longer!

Source: *elife* (4/Nov/2020), https://elifesciences.org/articles/60287

IS DIY TICK CONTROL EFFECTIVE?

Ticks are a cause of major human morbidity spreading infections like Lyme disease and Tick-borne Encephalitis virus. In many parts of the world people often encounter the ticks in their own backyard. Thus a simple and effective means of tick control would help to protect the community. Researchers from the US tested a granular form of gamma-cyhalothrin for the control of *Ixodes scapularis*, the main species that transmits Lyme disease. Tick populations were reduced by 97% after one week of application and by 89-97% 3-4 weeks post application. The results support the efficacy of a DIY product for tick control.

Source: *Journal of Medical Entomology* (27/Oct/2020), https://academic.oup.com/jme/advance-article-abstract/doi/10.1093/jme/tjaa212/5940896?redirectedFrom=fulltext

GETTING THE MESSAGE ACROSS: EDUCATING PEOPLE ON TICK MANAGEMENT

Knowledge of tick control in many parts of the US has been found to be extremely limited. Furthermore, getting the message to the public exceeds the ability of public health professionals. Researchers in the US took an alternative approach; they developed short story-based educational films called Spray Safe, Stay Safe, in order to better educate people on what insecticides to use for tick control. After viewing the films, many respondents felt more confident in undertaking tick management. The study demonstrated that using short films that can be posted to popular social media sites can be used to successfully educate the public on pest management.

Source: *Journal of Medical Entomology* (27/Oct/2020), https://academic.oup.com/jme/advance-article/doi/10.1093/jme/tjaa230/5934869

LIGHT POLLUTION MAY INCREASE BITING ACTIVITY OF MOSQUITOES

Research from the University of Notre Dame in the US has suggested that increasing light pollution may encourage day biting mosquitoes to bite longer into the night. *Aedes aegypti*, commonly known as the dengue mosquito, is one such mosquito that bites normally during the day. Researchers testing the biting rate of the mosquito during different times of the day and night, and during the night if artificial lights were on, then the mosquitoes were twice as likely to

bite. Light pollution around urban areas could then encourage these mosquitoes to bite longer and increase the risk of mosquito-borne diseases.

Source: *Science Daily* (20/Oct/2020), www.sciencedaily.com/releases/2020/10/201020161202.htm

FIRE ANTS PREVENT DROWNING WHILE FEEDING ON LIQUIDS

Researchers from China and the US presented small cups of sugar solution to black fire ants. The problem being that for the ants to take a drink, drowning was a major risk. The researchers were amazed to see the ants build up a pile of sand grains in and around the small cups. The liquid via capillary action was absorbed into the grains where the fire ants could drink the liquid without the risk of drowning. Rather like using a straw to sip coke! This is the first time scientists have observed the behaviour of any creature employing a siphoning technique to harness liquids.

Source: *Al Khakeej Today* (17/Oct/2020), https://alkhaleejtoday.co/international/5124576/These-ants-feed-without-risk-by-using-the-phenomenon-of-capillarity.html

REVIEW: HOUSE FLY MONITORING REVIEW

Alec Gerry from the Department of Entomology at the University of California in the US, recently published a review of the various methods used to monitor the house fly, *Musca domestica*. House flies can be a serious nuisance, particularly in animal facilities and also spread food-borne pathogens. Dr Gerry details the various methods of monitoring from early days of using fly traps and sticky paper, to even the use of regurgitation spots on white cards. He emphasizes such methods give fail to give a true estimate of house fly numbers but can be used as a comparison over time.

Source: *Journal of Economic Entomology* (15/Oct/2020), https://academic.oup.com/jee/advance-article-abstract/doi/10.1093/jee/toaa229/5924105?redirectedFrom=fulltext

NEW CRYSTAL FORM OF DELTAMETHRIN MAY CIRCUMVENT RESISTANCE

Researchers from New York University have changed the crystal structure of deltamethrin through a simple process of heating and cooling. The outcome has been a different crystal structure of the chemical that is 12 times more effective against malaria carrying mosquitoes. Normally the mosquitoes pick up the insecticides through its feet when walking on chemically treated surfaces. The new crystalline form develops long tiny fibres that is more effectively absorbed by the insect. Beyond the advantage of increased efficacy, the new crystalline form has been found to be quite stable, capable of killing mosquitoes for up to three months.

Source: *ScienceBlog* (13/Oct/2020), https://scienceblog.com/518991/chemists-create-new-crystal-form-of-insecticide-boosting-its-ability-to-fight-mosquitoes-and-malaria/

NEW ZEALAND: TOWARDS PREDATOR FREE

New Zealand's project called Predator Free 2050, which aims to eliminate feral animals by the year 2050 has been well reported within the *FAOPMA Magazine*. Recently, a full review of the process was published and is available free online through the link below. The article summarizes current practices and reviews new technologies, and summarises the advantages and disadvantages of each. The paper also reviews the social opposition to the program. Never before has an eradication program been undertaken on a nationwide scale. If successful, then this could become a model for other such programs.

Source: *Journal of Integrated Pest Management* (4/Jun/2020), https://academic.oup.com/jipm/article/11/1/8/5850062

AMCA SPECIAL ISSUE ON MOSQUITO CONTROL EMERGENCY PREPAREDNESS

The American Mosquito Control Association recently teamed up with the Centers for Disease Control and Prevention to produce a special issue on "mosquito control emergency preparedness, and response to natural disasters". Most papers relate to mosquito issues surrounding hurricanes and severe storms. The entire journal is publicly available and thus if you are involved mosquito management, it would be worth bookmarking the link below.

Source: *Journal of the American Mosquito Control Association* (Jun/2020), https://mosquito-jamca.org/toc/moco/36/2s ■