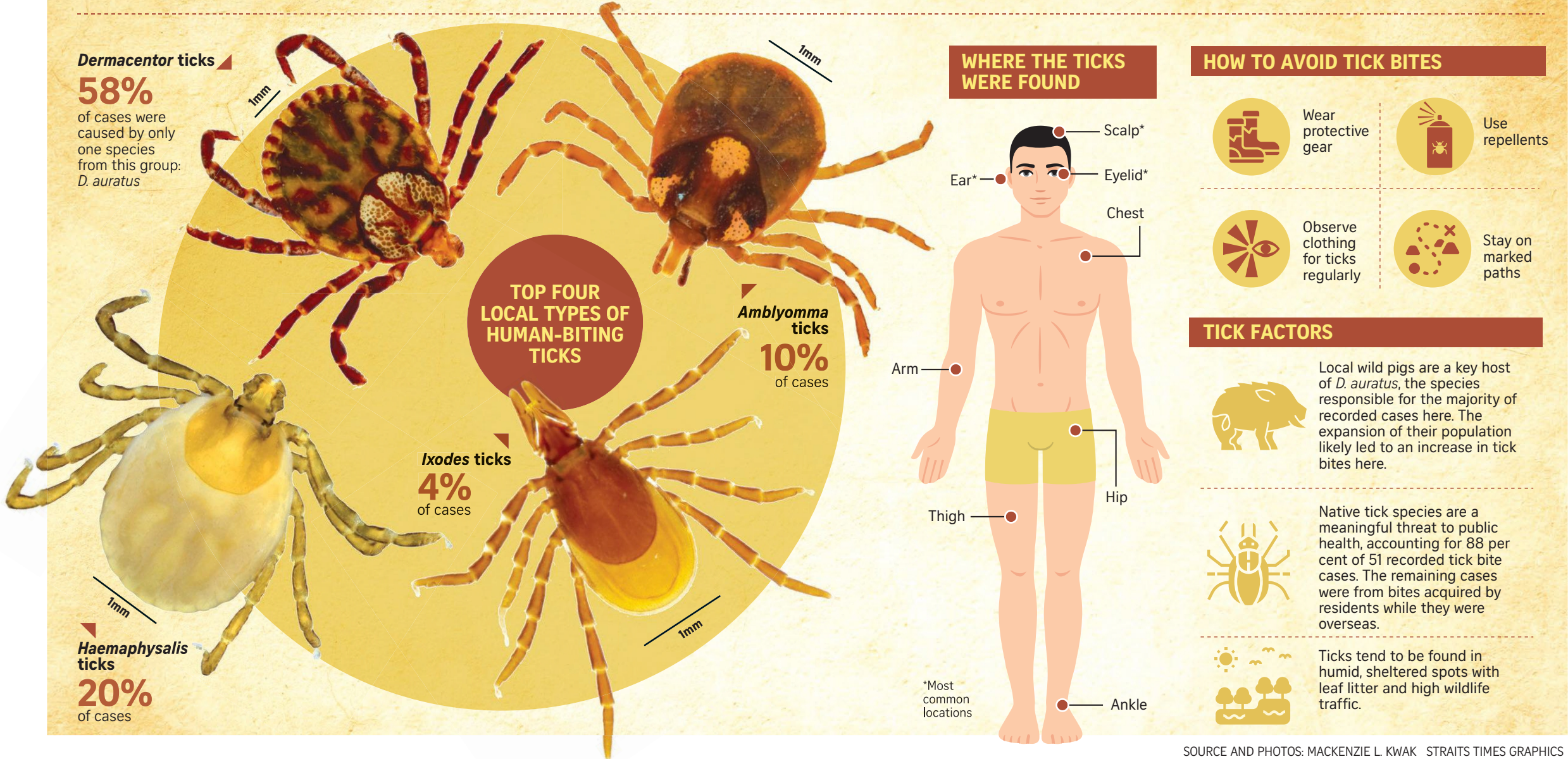


# SINGAPORE

## Parasitic bloodsuckers

Ticks are blood-feeding parasites that can harbour dangerous microbes that cause diseases. A recent study of tick bites recorded on humans in Singapore over two decades was released in January. **Ang Qing** looks at its key findings.



# TICKING MENACE

## Study flags public health threat posed by blood-feeding ticks

**Ang Qing**  
Correspondent

Hidden in leaf litter near wildlife corridors, a poorly known threat to public health lies in wait for hikers, cyclists and dog owners frequenting Singapore's green spaces. These spots are ideal for bead-size parasites called ticks, which can transmit diseases as they latch on to humans and feed on their blood.

While Singapore does not require doctors to report tick bites or tick-borne diseases, a recent study has learnt that all 11 species of ticks found to have bitten humans in the island state between 2002 and 2023 are capable of carrying one or more harmful microbes.

"If Singapore is going to be a city in nature, it needs to manage the parasites that come with the wild-life," said Hokkaido University parasitologist Mackenzie Kwak, lead author of the study by researchers based in Japan, Singapore, Switzerland and Saudi Arabia.

The paper, published on Jan 17, found that the gilded boar tick (*Dermacentor auratus*), named for its propensity to feed on wild pigs, had caused more than half of the 51 reported tick-bite cases between 2002 and 2023, making it the most medically important of Singapore's native ticks.

The species adorned with an ornate white pattern is a potential carrier of 10 kinds of microbes, including one that causes Kyasanur forest disease, which often sparks viral fever outbreaks in southern India.

Dr Kwak, who has specialised in ticks for over a decade, said: "They have been found on the skin around the eyes, the ears and on the scalp."

In one such case in Singapore, he said, a tick was originally mistaken for a sunspot before it began to grow, and the patient had to get a doctor to remove it.

The abundance of gilded boar ticks stems from the expansion of Singapore's wild pig population



since the 1990s, the researchers wrote.

The felling of forests and strengthening of green connectors between protected nature areas likely provide a means and a motivation for wild pigs to spread across Singapore.

Like most ticks, gilded boar ticks depend on a different host for each of the three stages of their life span.

Said Dr Kwak: "Once ticks are fully engorged, they drop off from their host to find a sheltered place to digest their blood meal, before emerging as their next stage and looking for their next host."

National University Hospital infectious diseases senior consultant Paul Tambyah said he usually gets roughly one patient every one or two years concerned about a tick bite.

Those bitten by ticks usually display no symptoms, he added.

Professor Tambyah said: "Most

people do not feel the tick bite and discover the bite when they are in the shower or someone – usually a spouse – asks them, 'What is that thing on your leg?'"

However, there have been occasions in Singapore when tick bites have resulted in more serious consequences.

As a former dog owner, Mr Lim, who declined to reveal his full name, was familiar with ticks and the dangers they presented to his pet. But the 40-year-old project manager was unaware that they could infect humans, too, until he was hospitalised for a disease believed to have been caught from a tick.

In December 2020, he discovered the arachnid attached to his right leg after returning home from a hike that cut through a patch of long grass in the north of Singapore.

He said: "I just pulled it off and

flushed it down the toilet bowl without thinking too much about it.

"But (over) the next few days, I had a high fever that wouldn't go down despite taking medicine."

By the time Mr Lim had to be hospitalised on Dec 5, 2020, he had a fever of 39 deg C, severe headaches, body aches and a rash.

It took nearly two days of tests for specialists to link the cause of his mysterious fever to his tick bite and prescribe him antibiotics, he said. He was discharged three days later after his fever subsided.

Months later, a test result from a laboratory in Australia confirmed that he had suffered from a bacterial infection found in ticks.

Mr Lim remains an avid hiker, but now ensures he protects all exposed parts of his body to reduce the risk of being bitten by a tick again. He said: "I now make sure that I have full coverage all the way

### SEEK MEDICAL HELP

**If you don't do that (remove the tick with a pair of tweezers) properly, the tick's mouthparts could remain embedded in the skin, potentially leading to infection or granuloma (a cluster of cells that causes lumps to appear) formation. So it's better to go to the doctor to remove it.**



**IMMUNOLOGIST BENOIT MALLERET,** on what to do when bitten by a tick.

A recent study has learnt that all 11 species of ticks found to have bitten humans in Singapore between 2002 and 2023 are capable of carrying one or more harmful microbes. PHOTO: MACKENZIE KWAK

National University of Singapore, has involved veterinarians, clinicians, wildlife biologists and members of the public across the island.

Immunologist Benoit Malleret, who co-authored the study, said: "If you're not looking for something, you won't find it."

Singapore's role as a major transit hub for wildlife also raises the risk of an infection transmitting from animals to humans, otherwise known as zoonotic spillover, he added.

He cited the escape of two lions on their way to an overseas facility from a container at Changi Airport in 2021. The predators were eventually sedated.

The NUS Yong Loo Lin School of Medicine assistant professor said: "If you read about Lyme disease, there are patients who can suffer from this tick-borne infection for years with no solution because symptoms are not consistent and may mimic other conditions.

"So we want to be sure that we are not facing these situations."

While a fatal tick-borne disease has yet to be detected in Singapore, it can establish quickly in local forests because one tick can produce hundreds to thousands of larvae.

Said Dr Kwak: "All it takes is one infected, pregnant tick to spread a pathogen (disease-causing organism) through the ecosystem."

Those afflicted by tick-borne diseases extend beyond humans, with the gilded boar tick able to carry the virus that causes African swine fever, which killed at least 18 pigs here in 2023.

Not all ticks are bad for their hosts, though. In fact, their ability to overcome the immune system is being studied to understand autoimmune diseases, which occur when the immune system attacks its own cells.

Dr Kwak, who is co-chair of an International Union for Conservation of Nature group for protecting parasites, said: "Some parasites are really important for training the immune system to react appropriately to allergies and autoimmune

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Hokkaido University parasitologist Mackenzie Kwak, lead author of the study by researchers based in Japan, Singapore, Switzerland and Saudi Arabia, says that if Singapore is going to be a city in nature, it needs to manage the parasites that come with the wildlife.  
PHOTO: MACKENZIE KWAK

# Ticks of the tropics still poorly understood

FROM A12

mune diseases.

“So in the process of understanding how parasites work, we can potentially use them to make new pharmaceuticals.”

He leads an effort to save the Ryukyu rabbit tick, a globally threatened Japanese parasite species that does not bite humans and keeps its host’s immune system primed.

Going forward, the researchers hope to map out the diversity and local ecology of tick-borne pathogens within Singapore, which is presently unclear.

Said Dr Kwak: “If you think of it as a play, we’ve identified the cast of characters, so we basically know who’s on stage.”

“Now we’re figuring out how the characters are interacting with one another.”

While the ticks in temperate countries like the US and Japan are

**While Singapore does not require doctors to report tick bites or tick-borne diseases, a recent study has learnt that all 11 species of ticks found to have bitten humans in the island state between 2002 and 2023 are capable of carrying one or more harmful microbes.**

relatively well studied, the ticks of the tropics, particularly South-east Asia, remain poorly understood.

Lauding the study, Tropical Council for Companion Animal Parasites chair Filipe Dantas-

Torres said identifying tick species that are most frequently found on humans is fundamental for measuring the health risks posed by these parasites to humans. This will pave the way for further studies on the pathogens associated with these ticks in Singapore and the surrounding region.

He added: “In countries where tick-borne diseases are prevalent or even in countries considered to be free of these diseases, it is pivotal to have a laboratory infrastructure to establish a surveillance system to assess the presence of ticks in various regions and hosts.”

Should members of the public in Singapore suffer from a tick bite, they should quickly and carefully remove the arachnid with a pair of tweezers instead of using other means.

Said Prof Malleret: “If you don’t do that properly, the tick’s mouthparts could remain embedded in the skin, potentially leading to infection or granuloma (a cluster of cells that causes lumps to appear) formation.”

“So it’s better to go to the doctor to remove it.”

[aqing@sph.com.sg](mailto:aqing@sph.com.sg)