

NOT ALL BATS FLY AT NIGHT

Species known to be nocturnal forages in the day on Tioman

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Bats may have earned the reputation of being creatures of the night. A Singapore scientist, however, has found a species that is nocturnal in Singapore and other parts of the world, but diurnal – active during the day – on a Malaysian island.

National University of Singapore (NUS) mammal scientist Marcus Chua discovered the Blyth's horseshoe bat flying and foraging for food in the day – unusual behaviour for a bat – on Tioman Island, about

five hours away from Singapore by car and ferry.

This is the first time that such behaviour has been recorded for this bat species, which feeds on insects.

The discovery by Mr Chua, a senior tutor at NUS' Lee Kong Chian Natural History Museum, and Dr Sheema Abdul Aziz, president of Malaysian conservation research group Rimba, was published in journal *Mammalia* last month.

Mr Chua said he first encountered the bat's unique behaviour in 2016, when he was conducting a field course for NUS life sciences honours students on Tioman.

"As it was an interesting phenomenon, I took copious notes, and contacted a few colleagues who are bat researchers in the region, including Dr Sheema, who noticed them

since 2014 at another part of the island while she was studying flying foxes," said Mr Chua. To investigate further, two subsequent trips were made to the island in July and September last year.

The daytime activity of the Blyth's horseshoe bat on Tioman is only the third known example in non-temperate regions. A nocturnal bat in the Azores in the Atlantic Ocean and a roundleaf bat from Sao Tome Island, west of Africa, are also active during the day.

The bat's unusual behaviour could boil down to one thing: survival. On Tioman, there are no native bird predators in the forest during the day that could pose a risk for these small bats, Mr Chua said.

This allows the Blyth's horseshoe bat, which grows to about the size of a human thumb, to take advantage of the daytime buffet of insects on the island.

"It is as if the island has become a 24-hour food centre for these bats, when in other places, predators are in the way of them coming out to feed during the day," said Mr Chua.

All three daytime bats occur on isolated islands with few bird predators, he added.

In Singapore, it is active only at night. This could be due to the presence of bird predators such as the bat hawk, crested goshawk, and migratory sparrowhawks, which are active during the day, said Mr Chua.

However, the observations of daytime activity in these bats on Tioman were made between March and September. Things could be different between October and February – the monsoon season in Tioman, said Dr Sheema.

She noted that while she was on the island in October 2015, the monsoon made an early entrance and there was plenty of rain during the

day. "It was the only time we didn't manage to encounter a single day-flying bat on our treks into the forest... It seems to provide some evidence for the theory that this behaviour might be seasonal," she told *The Straits Times*.

The monsoon months also coincide with the northern bird migration, which brings about potential migrant bird predators.

The findings show that general assumptions about how animals and living systems behave – such as the assumption that all bats are nocturnal – may not always be true, Mr Chua said. "The behaviour of living organisms may change when the environment changes because of the complex interactions involved," he said.

Awareness of the knock-on effects of changes in the population of one animal, for example, could better inform future ecosystem management strategies, he said.

And while many people may shun bats for their association with vampires in movies, these creatures are important for maintaining healthy ecosystems.

Dr Benjamin Lee, director for conservation at the National Parks Board, said: "Fruit bats perform important ecological roles such as pollination and seed dispersal, while insectivorous bats feed on insects such as mosquitoes and, hence, help to keep the insect population in check."

Like most wild animals, bats are shy. They are not aggressive but may bite or scratch if caught, Dr Lee said. He added: "Members of the public are advised to leave bats alone, and not attempt to touch or handle a live, sick, grounded or dead bat."

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FRUITFUL BENEFIT

Without them, we would not be able to enjoy the many kinds of fruits that we love, especially durians.



MR MARCUS CHUA, senior tutor at the National University of Singapore's Lee Kong Chian Natural History Museum.

NATURE'S HELPER

Fruit bats perform important ecological roles such as pollination and seed dispersal, while insectivorous bats feed on insects such as mosquitoes and, hence, help to keep the insect population in check.



DR BENJAMIN LEE, director for conservation at the National Parks Board.

Singapore's native bats

Bats may have earned a reputation as blood-suckers in popular culture, but they are not as scary.

In fact, they play an important role as gardeners and pest-controllers.

Mr Marcus Chua, senior tutor at the National University of Singapore's Lee Kong Chian Natural History Museum, said: "There are bats which dine on insects. And because they have to fuel their high metabolic rates and energy requirement from flying, a single bat can consume hundreds or thousands of insects each night."

Bats also help to spread plant pollen and seeds around when they feed. "Without them, we would not be able to enjoy the many kinds of fruits that we love, especially durians," Mr Chua said.

None of the bats in Singapore feed on blood.

Here, it may also be hard to spot them as these monochromatic creatures are active only at night. But there is a surprising diversity in the country.

There are at least 28 species of bats in Singapore, according to Dr Benjamin Lee, director for conservation at the National Parks Board. This means bats make up about 40 per cent of the native mammal species currently found in Singapore, which number at least 63, Mr Chua added.

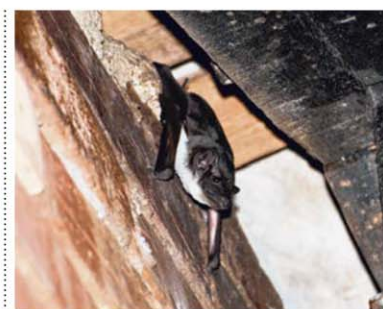
Here are some of them.

SOURCES: MARCUS CHUA, INTERNATIONAL UNION FOR CONSERVATION OF NATURE, WILDSINGAPORE.COM, NPARKS, ST FILE



Lesser false vampire bat (*Megaderma spasma*)

This bat is known mainly to occur in offshore islands such as Pulau Ubin and Pulau Tekong. Despite its name, it does not feed on blood. Instead, it is a predator of small animals such as insects, lizards and birds. It is threatened by the loss of its forest habitat, and is considered critically endangered in Singapore.



Pouched tomb bat (*Saccolaimus saccolaimus*)

This bat is common in Singapore. A nocturnal creature, this insectivorous bat roosts in rock crevices, hollow trees and buildings. It has a pouch on the throat that emits a strong scent.



Yellow house bat (*Scotophilus kuhlii*)

In forested areas, this bat can be found roosting communally in hollow trees. However, it has adapted well to urban environments and can be found in attics and abandoned buildings. It is commonly seen hunting insects attracted to street lamps and stadium lights.



Horsfield's bat (*Myotis horsfieldii*)

This bat has a pair of large feet which it uses to grab fish and insects while flying low over water bodies. It can be found roosting under bridges.



Cave nectar bat (*Eonycteris spelaea*)

This uncommon bat feeds on nectar and pollen, and is an important pollinator of forest trees including durians. It can be found roosting in large colonies in caves, old buildings and under concrete bridges.



Lesser dog-faced fruit bat (*Cynopterus brachyotis*)

Commonly seen around Singapore, this small bat has a wingspan measuring about the length of a person's forearm and can be found in parks and urban areas. It feeds on fruit and nectar, and plays a role in dispersing the seeds of trees.



Bamboo bat (*Tylonycteris sp.*)

Possibly the smallest bat in Singapore, this insect-eater can be found in secondary forests, parks and gardens. It is small enough to roost in the cavity of a bamboo plant.

PHOTOS: MARCUS CHUA, BENJAMIN LEE