

# Study: Nearly half of S'pore's butterfly species extinct

Some wiped out before they were discovered; loss of specific plants, deforestation to blame

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Almost half of Singapore's native butterfly species have disappeared over the past 160 years, with the loss of specific plants and deforestation being key drivers of the local extinctions.

Of the 236 butterfly species thought to be locally extinct, 132 are known species such as the green dragontail and chocolate tiger butterflies. There are 413 native species of butterflies in Singapore.

The other 104 are species that have likely gone extinct before they were discovered, said scientists, whose research was published on Friday in the scientific journal *Biological Conservation*.

Said the authors, who hail from institutions such as the National University of Singapore (NUS), environmental group BirdLife International and the London Natural History Museum: "We consider our high estimates of undetected extirpations (local extinctions) to be biologically plausible, because rapid forest loss would have wiped out many butterfly species, particularly primary forest specialists."

NUS Associate Professor Ryan Chisholm, who was involved in the study, said it also showed butterfly species were more likely to have been extirpated if their host plants were classified as rare or locally extinct today.

Dr Anuj Jain, an ecologist from BirdLife International, said that in the 1850s, the record of butterfly species in Singapore was poor.

He said: "Many species were still around at that time but were not discovered for another 50 or 100 years. Because many of the local extinctions were also recorded over this period, we can infer that some species were extirpated before they were discovered."

Accounting for this undetected extinction is important to give a more complete picture of how human activity impacts the butterfly diversity in Singapore, he added.

The scientists first compiled a list of butterfly species in Singapore and verified initial records with museum specimens.

Each species was assessed for its detectability and vulnerability to local extinction, using traits such as wingspan, the uniqueness of the type of habitats it relies on, and how abundant its host plants are, among other things.

Later, the scientists input data, such as the first and last record dates of a group of species, into a statistical model.

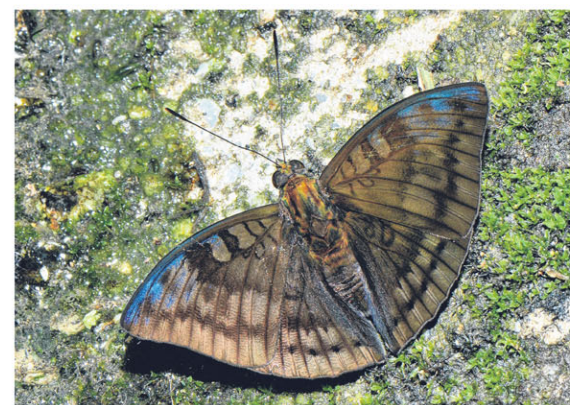
The results estimated that 104 species could have gone extinct before they were discovered. This is on top of the 132 known species extinctions in Singapore.

Overall, the estimated total local extinction rate was 46 per cent.

In comparison, about 7 per cent of butterfly species in Britain have



Of the 236 butterfly species thought to be locally extinct, 132 are known species such as (clockwise from left) the green dragontail, the wavy maplet and the yellow barred. PHOTOS: GAN CHEONG WEEI



Some of Singapore's native butterflies that are still present include the white tipped baron (left) and the painted jezebel. It could be an encouraging sign that half the butterfly species still remain even after Singapore's rapid transformation, says NUS Associate Professor Ryan Chisholm, who was involved in the study. PHOTOS: TEA YI KAI

gone extinct there.

But Prof Chisholm said Britain is much larger than Singapore and is overall not as intensively developed.

Moreover, tropical countries like Singapore tend to have a wider di-

versity of species compared with temperate regions.

He said: "There are no comparable studies of butterfly extinction on a similar scale to Singapore elsewhere in the tropics."

Butterflies are the gardeners of

many ecosystems, helping to pollinate plants. They are sensitive creatures, heavily reliant on surrounding foliage for nectar and shelter.

Caterpillars, the young of the butterfly, also need plants for food. Because of this dependence, they are

attuned to the slightest change or disturbance in their habitat, and help sound the warning when all is not right.

"Thus a decline in butterfly diversity can be a warning sign of environmental trouble," said Prof Chisholm.

Asked if the number of butterflies considered locally extinct was alarming, he said this was subjective.

While it may seem tragic that about half of the butterfly species in Singapore have gone extinct, it could also be an encouraging sign that half the butterfly species still remain even after Singapore's rapid transformation.

He said: "It is up to society at large to decide what levels of biodiversity loss are acceptable. The job of scientists is to provide the best numbers that we can to inform the public debate."

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