



A sea teak at Sembawang Park. It is a critically endangered species, owing to the very low number of mature individuals in the wild, said Mr Oh Cheow Sheng, group director for streetscape at NParks. ST PHOTO: LIM YAOHUI

Tropical gifts from Singapore's forests

Sightings of greater mouse deer a sign that all is not lost for the environment

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The recent cool weather has made it feel a lot like Christmas, sans the snow. Festive cheer abounds in decked-up malls, but common Christmas motifs may not just be plastic figurines in urban areas.

Living, breathing specimens can also be found in Singapore's many green spaces.

The mouse deer, the tropical cousin to the reindeer, continue to forage in local forests. And in parks and along the streets, coniferous "Christmas trees", with their iconic conical shapes and needle-like leaves, stand proud and tall.

In this season of giving, take a closer look at Singapore's nature areas. You may be surprised by what you find under our very own evergreen trees.

MOUSE DEER

For mammal scientist Marcus Chua, Singapore's forests are the gift that keeps on giving. The mouse deer researcher received his first surprise on a moonlit night on Pulau Ubin in 2008.

While carrying out wildlife surveys on the island as part of his coursework as an undergraduate at the National University of Singapore (NUS), he came across a rare sight: a greater mouse deer (*Tragulus napu*), which was quiet save for the shuffle of its tiny feet.

There had been no records of the species on the island since 1921, and it was considered to be nationally extinct.

In 2012, a different forest yielded another bounty for the scientist who is now with the NUS Lee Kong Chian Natural History Museum.

Footage captured by camera traps Mr Chua placed in the Western Catchment forests on the mainland showed another record of a greater mouse deer.

The sighting was significant. Even though there had been earlier efforts to re-introduce the species to the central forests of Singapore,

the Western Catchment sighting was the first confirmed record of the greater mouse deer on the main island of Singapore since 1923.

Mouse deer tend not to roam too far, moving within an area the size of two to 12 football fields to look for food and mates, said Mr Chua.

Recounting his re-discoveries to *The Straits Times* recently, he said: "Checking camera trap footage is like opening a present. Because you'll never know what was captured by the cameras."

"The findings give us hope that the environment is not a lost cause, and we can still conserve and rehabilitate areas for the sake of people and wildlife."

"Life may find a way to hang on, but maybe what is more important is what we do next to prevent these species from getting lost again."

Mr Chua's re-discovery of the greater mouse deer in Singapore brings the total number of mouse deer species here to two.

The other species is the lesser mouse deer (*Tragulus kanchil*), which can be found in the Central Catchment Nature Reserve and its surrounding buffer parks, such as the Thomson Nature Park.

Mouse deer and reindeer are distant genetic relatives, with a number of differences.

A noticeable one is that mouse deer do not have antlers. Instead, males have fangs that they use for fighting other males, said Mr Chua.

Mouse deer are also significantly smaller than other deer – a larger group of mammals, including the reindeer – which is how it got its name. But its size is an advantage for life in the tropics.

Mr Chua said: "They lose heat better, and it reduces the need to consume a large amount of food, which can be difficult to come by in tropical forests."

Being small probably also helps mouse deer navigate the tangled undergrowth of tropical forests more easily, he added.

"Conversely, being big like a reindeer helps when living in colder climates as larger animals retain heat

better," said Mr Chua, whose current research focuses on the mouse deer of the world.

There is one species in Africa, three in the Indian sub-continent, and six in South-east Asia, including the two from Singapore.

Mouse deer are a rather poorly studied group, he said, and little is known about the population size of Singapore's two species, and the threats to their survival.

"The answers to some of these unknowns are important because of the pace of development in Singapore and the region," he said, pointing to developments such as the Cross Island MRT line and the Mandai nature precinct.

"In the bigger scale of things, there is a need to understand how many species of mouse deer there are, and whether any populations

CAUSE FOR HOPE

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MAMMAL SCIENTIST MARCUS CHUA, on the sighting of a greater mouse deer in the Western Catchment forests.



are threatened by the massive deforestation in the region."

TROPICAL CHRISTMAS TREES

Tropical forest environments are usually hot, humid and extremely leafy, as they are generally dominated by dipterocarp trees that have broad, thick leaves.

But nestled within Singapore's parks and along certain streets are trees with needle-like leaves or conical shapes that would remind one of wintry Christmases.

Casuarina trees found on Coney Island, for example, have needle-like "leaves" that resemble the iconic Christmas pine trees – a type of conifer.

Yet, the casuarina is not related to them, said Mr Oh Cheow Sheng, group director for streetscape at the National Parks Board (NParks).

"The needle-like, greyish-green 'leaves' are in fact twigs which photosynthesise, and the true leaves of this tree are reduced to tiny scales surrounding the twigs in whorls," said Mr Oh.

This conifer-like feature helps the trees thrive in their coastal habitat, where there are strong winds and hot and dry conditions. "The reduced leaves of the casuarina decrease water loss through transpiration, and also reduce wind resistance from strong winds," he said.

Conifers refer to a group of woody trees and shrubs that usually have needle-like or scale-like leaves, and bear "exposed" seeds, usually on the scales of cones, said Singaporean botanist Jean Yong, from the Swedish University of Agricultural Sciences' Department of Biosystems and Technology.

In colder regions, the cone shape of a conifer helps keep wet, heavy snow off its upper branches and reduces wind resistance, said Professor Yong.

Pine trees are the most abundant conifers in the Northern Hemi-

sphere, while redwoods, such as the sequoias of California, are the tallest. The custom of celebrating Christmas with evergreens, like the pine tree, goes back centuries. But the evolutionary history of conifers go back to a time when dinosaurs still walked the earth.

Prof Yong said: "Conifers belong to a group of primitive seed plants called gymnosperms, which were the dominant land plants in the age of dinosaurs – the Cretaceous and Jurassic periods."

In Latin, gymnos means naked, while sperma is taken to mean seed, said Prof Yong.

The seeds of flowering plants, known as angiosperms, are enclosed in the ovary, or the flesh of the fruit, such as long beans or apples. But gymnosperms carry their seeds in a more exposed way, such as on cones, said Prof Yong.

Despite being commonly associated with temperate climates, conifers can also be found in the tropics and the sub-tropics.

A few species, such as the Borneo kauri and the Cook pine, can be found in Singapore.

But there is also an evergreen conifer native to Singapore – the sea teak, which can be found in places like Kampong Glam Park and Sembawang Park.

Like all conifers, the sea teak produces cones for reproduction, said NParks' Mr Oh, although its leaves are not needle-like but narrowly lance-shaped.

It is also a species that is critically endangered due to the very low number of mature individuals in the wild, said Mr Oh. But efforts are being taken to increase their number, with sea teak seeds and cuttings being propagated at NParks' Native Plant Centre.

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