



The *Aristolochia jackii* (left), which was last recorded in the Jurong Swamp in the 1930s and is now extinct here, is the original host plant of the threatened common rose and common birdwing butterflies. The *Aristolochia acuminata* (right), or dutchman's pipe, was likely brought to Singapore from as early as 1918, and National University of Singapore researchers found that it provided a lifeline to the butterflies after their native host plant became extinct. PHOTOS: GAN CHEONG WEEI

Local butterflies develop taste for the exotic

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Two butterfly species native to Singapore have developed a taste for a plant from elsewhere after their native host plant here went extinct, a new study has found.

The key finding of the study – that non-native plants may benefit native wildlife – is a departure from the prevailing paradigm that exotic species negatively affect the environment.

The original host plant of the threatened common rose and common birdwing butterflies is *Aristolochia jackii* – last recorded in the Jurong Swamp in the 1930s.

So how did both species, which are known to be picky eaters, survive over the decades?

The new study, published in the journal *Frontiers In Ecology and Evolution* earlier this month, proved that the insects had found a lifeline in an exotic plant species known as the dutchman's pipe (*Aristolochia acuminata*).

The dutchman's pipe is naturally found across Asia including in Malaysia, parts of Indonesia as well as Australia. It had likely been brought to Singapore as an ornamental plant from as early as 1918, and is today occasionally planted in parks and gardens here.

While butterfly enthusiasts had for years noticed the presence of both butterfly species around this plant, the latest study by National University of Singapore (NUS) researchers showed a definite relationship.

They did this by first mapping out the places where the butterflies had been sighted, using information from historical records dating back to 1999 and by conducting surveys in forests, parks and gardens here. This was then overlaid onto another map showing the locations of the dutchman's pipe plant across the island.

The researchers then used computer models to determine if other factors could have an influence on where the butterflies thrive.

One of these was the proximity of butterfly sightings to their known source populations, which are the original groups that later dispersed around the island.

Their study found that the highest abundance of common birdwings was in urban parks, while private gardens saw the largest numbers of the common rose.

The researchers also found that if dutchman's pipe plants were located near the 14 source populations identified by the study, there was a greater chance of the butterflies being sighted there.

"Urban plantings are critical for the survival of these butterflies,"



noted the authors in the study.

This is unusual for both species, which are known to be forest dwellers in other parts of South-east Asia. But NUS ecologist Anuj Jain, lead author of the paper, said that their urban preference here may be because the dutchman's pipe is found only in urban areas.

Dr Anuj said urban plantings are prone to frequent landscape changes. "This dependence makes the butterflies particularly vulnerable to local extinction," he said.

While reintroduction of the butterflies' native host plant *Aristolochia jackii* should be prioritised, Singapore should consider planting the dutchman's pipe in or near forested areas to boost the chances of survival for both species.

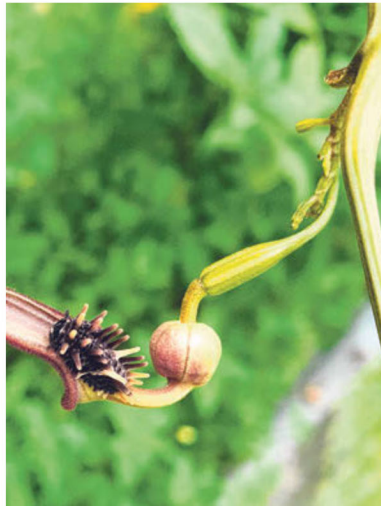
Dr Chong Kwek Yan, a botanist and senior tutor at NUS who was not involved in the latest study, said the use of native species should be preferable unless outweighed by other considerations.

Such considerations would differ between contexts, he said. "In highly managed parks and streetscapes, where there are already many non-native species being planted, another non-native plant such as *Aristolochia acuminata*, which has already been used horticulturally in Singapore for so long, would not pose much additional risk," he said.

But planting non-natives in nature reserves would require a lot more consideration, he said.

Mr Ryan Lee, group director of the National Parks Board's National Biodiversity Centre, said other non-native plants such as the trumpet and rain trees also support native flora, such as the pigeon orchid. But he said that NParks is aware of the need to carefully curate and manage the planting of non-native plants to protect the resilience of native ecosystems and will continue to do so.

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Above, left: The common birdwing butterfly. The NUS study found that this species is most abundant in Singapore's urban parks.

Above: The common rose butterfly. Private gardens see the largest numbers of this species.

Far left: The common birdwing caterpillar on a flower of the *Aristolochia acuminata*, or dutchman's pipe, a plant that is found only in urban areas.

Left: The common rose caterpillar feeding on the seedpod of the dutchman's pipe.

PHOTOS: TEA YI KAI, GAN CHEONG WEEI