

Despite its small size, Singapore is teeming with a large variety of animal and plant species. But conserving them is an ongoing challenge. In this five-part weekly series done in conjunction with Biodiversity Week that starts on May 20, *The Straits Times* highlights several of the species which have been saved from the brink of extinction. Today, in the first of this series, we look at the Singapore freshwater crab.

This Singapore crab is not for eating

Just a few hundred *J. singaporensis* remain, so species has its own national protection plan

Lin Yangchen

A drab brown crab looking as monotonous as the sand around it – apart from its faintly striped legs – is not something you would suspect to be of national importance.

But *Johora singaporensis*, the Singapore freshwater crab, has been given its very own national action plan of protection, for it is truly, uniquely Singaporean and is not found anywhere else in the world.

Its abodes in rocky, crystal-clear freshwater streams in the forested hills of Singapore are so critical that the National Parks Board (NParks) safeguards information on the locations as if it were a state secret.

Scientists estimate that only a few hundred mature individuals remain in the wild. The International Union for Conservation of Nature (IUCN) considers it critically endangered and among the 100 most threatened species worldwide.

No bigger than a USB flash drive, it feeds on plants and animals dead or alive, and helps recycle nutrients in the aquatic ecosystem.

Assistant Professor Darren Yeo, from the National University of Singapore's (NUS) department of biological sciences, said the species originated about five million years ago when a population of crabs was geographically isolated from simi-

lar populations elsewhere and evolved into *J. singaporensis*.

The species was officially described and named in 1986 by NUS' Professor Peter Ng, who later taught Prof Yeo when he was an undergrad.

Three freshwater crab species are found only in Singapore, but the other two have less stringent habitat requirements or are found in better-protected areas like the Nee Soon Swamp Forest, said Prof Yeo.

He remembers the first time he saw the crab in the wild, while he was an undergraduate helping NParks with a survey of freshwater streams in the mid-1990s.

Turning over rocks and leaves in the water, he spotted the elusive creature. "I said to myself: 'Oh, this is cool; this is the thing that my professor described.' And then it went back into the water," he said.

In 2008, researchers discovered that *J. singaporensis* had disappeared from Jungle Fall Valley in the Bukit Timah Nature Reserve (BTNR), where it was originally found by Prof Ng.

NUS biological sciences lecturer N. Sivasothi, one of the researchers who made the discovery, said: "It was the start of a realisation that the environment had changed."

He and his colleagues then uncovered a report that had previous measurements of the water at the



stream, and found that the water had increased in acidity. The reason for this remains a mystery, as other streams in the reserve appear to be unaffected.

Meanwhile, the crab clings to a tenuous existence in a handful of other freshwater streams in BTNR, Bukit Batok and Bukit Gombak.

The episode motivated Mr Sivasothi to enrol some of his under-

graduate students in project work to better understand the characteristics of freshwater streams here.

"I tell the students that we have a national responsibility," he said.

In 2014, researchers and officers from NParks, NUS, Wildlife Reserves Singapore, IUCN, other government agencies and non-governmental organisations met to form a conservation strategy for the crab.

A year or two later, some of the crabs were translocated to a stream with suitable conditions where they had not been found before.

Today, the crabs seem to be thriving there. The researchers found that some had shed and renewed their exoskeletons – a sign that they had grown bigger.

NParks is working with its partners on a population enhancement

and monitoring programme, including captive breeding.

Conservationists say the crab can be a national icon. For a start, it was pure luck that the most vulnerable of the three crabs found only in Singapore was named after the country. This has helped elevate its status, said Prof Yeo.

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Johora singaporensis, one of three freshwater crab species found only in Singapore, in its natural habitat in a clear flowing forest stream.
PHOTO: DANIEL NG, NATIONAL PARKS BOARD



WATCH THE VIDEO

See the Singapore freshwater crab in action. <http://str.sg/4BH7>