

Growing organisms to build healthier reef

NUS researchers use Lego blocks to culture hard corals in bid to boost yield sustainably

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They are both small, colourful and fragments of a larger whole.

So when marine scientists in Singapore brought the two together in the name of conservation, the Lego blocks and hard coral bits were a match made in underwater heaven – or so they hope.

Researchers at the National University of Singapore (NUS) are trying out a new method of growing hard corals in laboratories, so tank space can be used more efficiently to grow a greater number of these fragments to larger sizes.

The project's principal investiga-

tor Neo Mei Lin, from the NUS Tropical Marine Science Institute, said the findings could be useful for aquarium businesses looking to reduce reliance on wild populations for the trade.

Growing hard corals in nurseries is not a new phenomenon. But this is usually done by placing coral fragments on substrate such as tiles at the bottom of a shallow tank. This allows the corals to still soak up the sun, letting the algae that live in their folds photosynthesise and produce nutrients that nourish them.

Now, the researchers want to make use of not just the base of the tank, but the entire water column, where bits of hard coral are placed on Lego blocks along the length of

a fishing line.

If successful, this could increase yield by many times.

Dr Neo said: "The usual way of culturing corals is done in two-dimensional space, but now we are testing whether we can make full use of the vertical water column..."

"We also want to see if the corals can grow even while suspended in the water on a secure substrate like the Lego blocks or concrete tiles."

Scientists are monitoring whether the shading effect of suspended corals could cause their brethren deeper down to suffer from the lack of sunlight.

The coral growing initiative is part of a larger mariculture project led by Dr Neo to see how three marine organisms – hard corals, giant clams and cowries – can be grown outside of their natural habitat.

By combining her expertise with that of Dr Jani Tanzil and Dr Huang Danwei – NUS marine biologists

who specialise in coral ecology and genetics respectively – Dr Neo could expand the project to include all three animals that are threatened with extinction. The three are often poached from the wild to feed the aquarium trade.

The three-year project is funded by Temasek Foundation, and started with hard coral propagation last October. A foundation spokesman said the project will focus on enhancing the culture methods of the three organisms.

It will also assess the feasibility of scaling up production, he said, so products made from these organisms can be sustainably supplied to support marine science research and conservation, as well as the aquarium trade in Singapore.

Dr Neo told *The Straits Times* that the project has another component looking into how the origins of aquarium species can be deter-

mined, starting with hard corals. "It is usually difficult to establish the status of the organisms to hold in an aquarium, unless there is a tracing or tracking protocol," she said.

The team is studying how the traceability of an organism can be established through things like radio-frequency identification, or RFID, tags or dyes on its skeleton.

Genetic barcoding – or snippets of genetic material that function like barcodes in a supermarket – could also provide insight into where it comes from, although more research is being done to see if this is indeed the case.

"In applying these methods to the aquarium trade, the key is having an established database of the parent stocks to compare with should the need arise," Dr Neo explained. "For instance, if Country A exports corals to Country B – the local authorities in country B may want to verify whether they were cultured or taken from the wild."

The Temasek Foundation spokesman added: "Growing Singapore's expertise in the cultivation of commercially valuable marine species can allow us to potentially lead in environmental sustainability through the provision of locally cultivated and traceable stocks in global commercial trade."

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Guardians of the reef and sea

Hobbyists often enjoy decorating their tanks with elements of the sea. To feed this demand, creatures like giant clams, cowries and hard corals are often taken from the wild – decimating their numbers. Now, National University of Singapore (NUS) scientists are embarking on a research project that could save them from overharvesting. To mark World Ocean Day tomorrow, AUDREY TAN, LEE HUP KHENG, LEE YU HUI and BILLY KER dive into how these sea guardians are saving the creatures of the reef.

In a three-year project funded by Temasek Foundation, the researchers are studying three animals that are often harvested from the wild for the aquarium trade: Hard corals, giant clams, and cowries. They aim to:



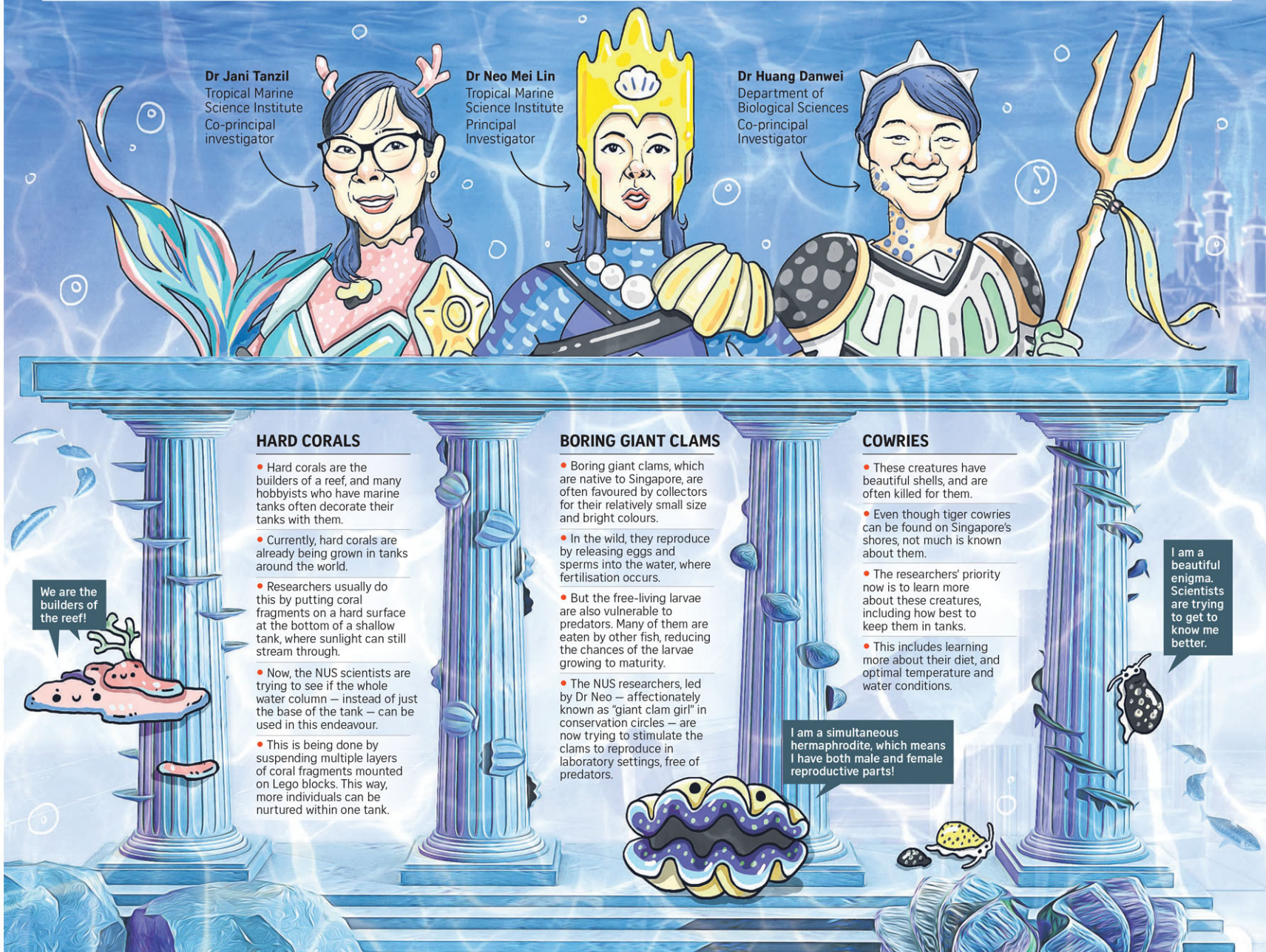
Determine the ideal conditions needed by these creatures to thrive in tanks.



Study ways to help each generation produce more offspring.



Explore ways of tracing whether such marine products come from sustainable sources, through the use of genetic barcoding, dyes or other chemical means.



Dr Jani Tanzil
Tropical Marine Science Institute
Co-principal investigator

Dr Neo Mei Lin
Tropical Marine Science Institute
Principal Investigator

Dr Huang Danwei
Department of Biological Sciences
Co-principal Investigator

HARD CORALS

- Hard corals are the builders of a reef, and many hobbyists who have marine tanks often decorate their tanks with them.
- Currently, hard corals are already being grown in tanks around the world.
- Researchers usually do this by putting coral fragments on a hard surface at the bottom of a shallow tank, where sunlight can still stream through.
- Now, the NUS scientists are trying to see if the whole water column – instead of just the base of the tank – can be used in this endeavour.
- This is being done by suspending multiple layers of coral fragments mounted on Lego blocks. This way, more individuals can be nurtured within one tank.

We are the builders of the reef!

BORING GIANT CLAMS

- Boring giant clams, which are native to Singapore, are often favoured by collectors for their relatively small size and bright colours.
- In the wild, they reproduce by releasing eggs and sperms into the water, where fertilisation occurs.
- But the free-living larvae are also vulnerable to predators. Many of them are eaten by other fish, reducing the chances of the larvae growing to maturity.
- The NUS researchers, led by Dr Neo – affectionately known as "giant clam girl" in conservation circles – are now trying to stimulate the clams to reproduce in laboratory settings, free of predators.

I am a simultaneous hermaphrodite, which means I have both male and female reproductive parts!

COWRIES

- These creatures have beautiful shells, and are often killed for them.
- Even though tiger cowries can be found on Singapore's shores, not much is known about them.
- The researchers' priority now is to learn more about these creatures, including how best to keep them in tanks.
- This includes learning more about their diet, and optimal temperature and water conditions.

I am a beautiful enigma. Scientists are trying to get to know me better.