

# NUS team tracking benefits of giant clams

Their shells help coral reefs grow and attract more marine life

By CAROLYN KHEW

CONSERVING giant clams is not just good for biodiversity, but it also brings benefits to coral reefs and the quality of waters – and there is now stronger evidence to support that.

A new study by five researchers from the National University of Singapore (NUS) sought to quantify just how much giant clams contribute to coral reef ecosystems around the Indo-Pacific.

The paper, entitled *The Ecological Significance Of Giant Clams In Coral Reef Ecosystems*, found that giant clams play an important role in the building of coral reefs.

The giant clams produce calcium carbonate from their shells which is eventually deposited on the coral reef framework, leading to bigger reefs.

After the clams die, their shells are also deposited on the reefs.

That would attract more marine life to live there, thus enhancing overall biodiversity, said lead researcher Neo Mei Lin from the Tropical Marine Science Institute (TMSI).

It is estimated that dense populations of giant clams living in coral reefs can contribute hundreds to thousands of kilograms per hectare of shell material to the reef annually.

To quantify the giant clams' ecological contributions, the re-

search team reviewed more than 400 publications and extracted relevant data to calculate productivity and clearance rates for three giant clam species.

Dr Neo and Assistant Professor Peter Todd from the NUS Experimental Marine Ecology Laboratory, who was also part of the research team, said they sought to “add numbers” to existing research on giant clams, which has, so far, been anecdotal.

They hope that the study can provide a greater push for the conservation of giant clams.

Among other findings, the bivalves were also found to help keep waters clean.

A population of 432 *Tridacna gigas* – the biggest among the species of giant clams – in the Great Barrier Reef, Australia, was found to be able to filter over 28,000 litres of water per hectare per hour.

By filtering large volumes of water, the giant clams “can potentially counteract eutrophication”, said the researchers in the paper, which was published in scientific journal *Biological Conservation* last month.

Eutrophication refers to the process where nutrients, such as those found in fertiliser, accumulate and affect water quality, causing algae bloom, which can reduce light penetration to the sea bottom.

Coral reefs and giant clams



## SINGAPORE'S GIANT CLAMS

Conservation Status	Species Name	Key Characteristics
ENDANGERED	Boring giant clam ( <i>Tridacna crocea</i> )	<ul style="list-style-type: none"> <li>The smallest of giant clam species can grow up to 15cm long.</li> <li>It is the most common species in Singapore during low tide and is the only species that embeds itself entirely into reef substrates.</li> </ul>
CRITICALLY ENDANGERED	Fluted giant clam ( <i>Tridacna squamosa</i> )	<ul style="list-style-type: none"> <li>The clam has fingernail-like projections called scutes, which provide defence against predators.</li> <li>The scutes make the shell bigger, which means that fewer predators can crush the clam.</li> <li>The clam, which can grow to 40cm long, is the focal species of Singapore's restocking programme.</li> </ul>
CRITICALLY ENDANGERED	Small giant clam ( <i>Tridacna maxima</i> )	<ul style="list-style-type: none"> <li>The clam, which grows up to 35cm, partially embeds itself into reef substrates.</li> <li>It is a popular aquarium species due to the bright colours of its mantle (outer membrane of body, excluding shell).</li> </ul>
BELIEVED TO BE LOCALLY EXTINCT	Horse's hoof clam ( <i>Hippopus hippopus</i> )	<ul style="list-style-type: none"> <li>The giant clam, which has a colourful and distinct shell, can grow up to 40cm long. Its mantle does not extend beyond the upper margin of the shell.</li> </ul>
BELIEVED TO BE LOCALLY EXTINCT	Giant clam ( <i>Tridacna gigas</i> )	<ul style="list-style-type: none"> <li>This largest known bivalve (with two half shells) can weigh more than 200kg and grow to more than 1m.</li> <li>Its average lifespan in the wild is more than 100 years.</li> </ul>

Sources: NEO MEI LIN FROM THE TROPICAL MARINE SCIENCE INSTITUTE, PETER TODD FROM THE EXPERIMENTAL MARINE ECOLOGY LABORATORY AT THE NATIONAL UNIVERSITY OF SINGAPORE

NOTE: Photos are not to scale

GRAPHICS: TANG WEE CHEOW PHOTOS: NEO MEI LIN, RIA TAN – WHO RUNS WEBSITE WILDSINGAPORE



Dr Neo Mei Lin and Assistant Professor Peter Todd are part of the NUS research team working on quantifying the contributions of giant clams to coral reef ecosystems around the Indo-Pacific. ST PHOTO: LAU FOOK KONG

**A population of 432 *Tridacna gigas* in the Great Barrier Reef, Australia, was found to be able to filter over 28,000 litres of water per hectare per hour.**

need sunlight to photosynthesise. Habitat loss, reef degradation and overfishing of the reef-dwelling giant clams for food in the past are believed to have led them to become endangered.

Today, two species of the giant clam – the horse's hoof clam and the *Tridacna gigas* – are locally extinct. Three other giant clam species – the fluted giant clam, the boring giant clam and the small giant clam – are either endangered

or critically endangered. Extensive surveys conducted around more than 20 reef sites in Singapore waters found just over 50 giant clams.

The Experimental Marine Ecology Laboratory has been working with the TMSI to breed giant clams and it is hoped that they can eventually be reintroduced into reef sites here.

The TMSI's marine biology research group has a giant clam hatchery housed in an outdoor aquarium on St John's Island, where the group is based. The hatchery has about 500 juvenile fluted giant clams which TMSI hopes to put out to reef sites once they are bigger.

The group is also trying to grow the *Tridacna gigas* in its hatchery.

This species can grow to more than 1m in size and weigh more than 200kg. It is believed to have once lived in Singapore waters.

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