

SEA FOREST: A reef at St John's Island. Bits of coral are placed in the waters around the island hoping that they will grow.

Coral islands

**IN A MASSIVE UNDERSEA
REFORESTATION PROJECT, CORALS ARE
BEING REPLANTED IN A BID TO SAVE
THE REEFS IN SINGAPORE'S WATERS**

By CHANG AI-LIEN

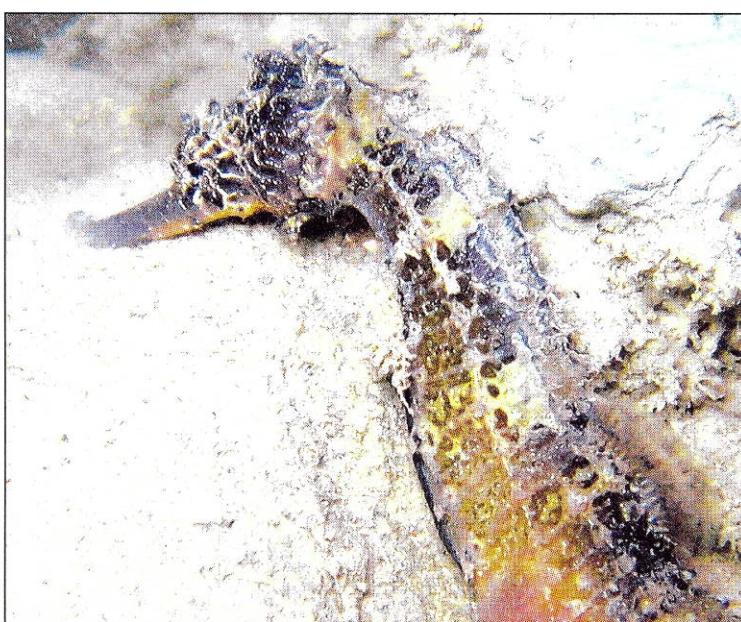
BUDDING undersea colonies are being planted around Singapore in an effort to reforest some of the world's most silt-filled waters.

Large-scale efforts here include transplanting small pieces of coral to degraded areas, where they will hopefully take root, and providing artificial homes for corals to attach to.

The idea is to throw a lifeline to corals, the ocean's lifeblood and home to the world's richest store of biodiversity.

Marine expert Professor Chou Loke Ming, a key member of the two projects, said: "My vision is that we can be a centre for reef restoration in view of the extent of reef degradation."

Urbanisation has wiped out over 60 per cent of the reefs here, but the estimated 30 sq km that has survived is almost as rich as ever.



FAN CLUB: Sea fan (top) and seahorse (above) are some of the underwater life that are thriving around St John's Island, but these signs of life cannot be taken for granted.

The reefs fringing Singapore's more than 50 southern offshore islands are home to about 200 species of hard coral — a quarter of the global total — as well as 20 species of soft coral and more than 130 types of fish.

Sediment is the arsenic of coral, and because of the reclamation and dredging work here and heavy volume of marine traffic, it is present in large amounts in Singapore waters.

But species here seem to have miraculously developed some immunity to the milky waters, thriving in the shallows where sunlight can penetrate.

Research assistant Jani

Thuaibah Isa Tanzil, who has been actively involved in the latest project, warned, however: "We can't take this for granted. We don't know if they will still survive if the situation gets any worse."

Much of the project comprises exhausting work. For instance, about 3,000 tiny bits of coral called nubbins, harvested from existing colonies here, were painstakingly cemented to plastic pins similar to large golf tees.

These were placed in mesh nets in the waters around St John's Island, and will later be re-integrated into the reefs if they grow.

Care was taken to remove less than 10 per cent from each existing colony, so that they could regenerate, she said.

The project is part of a \$2 million-euro (\$4 million) programme, a four-year multi-country effort helmed by the European Commission.

Singapore is one of six countries involved in the project, and the restoration aspect is to try and increase the success of natural coral recruitment occurring on the reef, where spawning has been documented.

Said Italian marine biologist Lucia Bongiorni, who was here to oversee the transplantation effort: "Singapore is a very special site, because its waters have some of the highest sedimentation rates in the world.

"It will be tough, but if it works here, this is good news for similar efforts in other parts of the world."

Meanwhile, Singapore's most ambitious undersea conservation effort has also taken off, with stretches of artificial reefs ringing the Southern Islands being put up for adoption.

The idea is that coral will attach more easily to these artificial dome-shaped structures, and ultimately cover 20,000 sq m, or one-fifth of the shallows around a handful of Southern Islands developed and linked through reclamation.

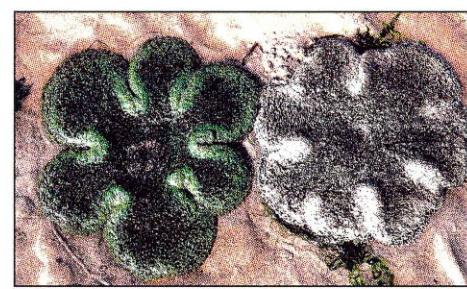
But Prof Chou warned that while levelling the undersea habitat took just an instant, regenerating it is a slow process that would take years to bear fruit, if at all.

"This is not like planting instant trees," said Prof Chou of the National University of Singapore's biological sciences department. "Corals are slow growing, and very delicate."

Unlike the endless clear blue of famous dive spots such as the Maldives, divers here are lucky if they can see beyond their outstretched hands in the jade green waters.

Life is thriving nonetheless. A dive in the waters fringing Kusu Island, for example, yields rich rewards for those who care to take the plunge.

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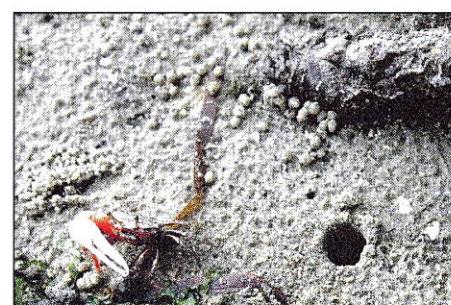
FLOWERS OF THE SEA (above and left): Carpet anemones have stinging cells in their short, sticky tentacles to paralyse the animals which blunder into them. Their different colours are caused by symbiotic algae living in the tentacles.



SOLITAIRE: Unlike other crabs, hermit crabs have a long, soft abdomen that is twisted to the side to fit into the spiral of the shell it houses itself in. When it grows bigger, it will up and move into a bigger shell.



CRABBY: During the day, the leaf porter crab hides under a leaf it carries. At night, it swims on top of it to hide from aquatic predators. But if it senses danger from above, it will flip underneath again.



BUBBLE WRAP: The fiddler crab cannot swim and breathes air. During high tide, it scurries back to its burrow, plugging the entrance with a ball of sand to trap some air inside until the next low tide.



SPINY CREATURE: Cake sand dollars may look dead, but they are very much alive. Tiny spikes cover their bodies, they look velvety and they breathe with tiny tube feet that stick out of holes in their skeletons.

Waterfront developments

CHANG AI-LIEN DISCOVERS SOME OF THE TREASURES THAT CHEK JAWA IN PULAU UBIN HOLDS

IT IS the poster child of conservation.

The intertidal nature site of Chek Jawa on Singapore's rustic Pulau Ubin was preserved because people from all walks of life rallied around it, persuading the authorities to put off reclamation there. And now, the waving pastures of sea grass, the soft shores strewn with carpet anemones and sea stars, are theirs to enjoy.

For years, this special spot was secret, because its bounty surfaced only for a few hours during the lowest of tides. It was only in late 2000 that nature lovers stumbled on it during an outing.

The beauty of Chek Jawa is that several different ecosystems converge in this 1 sq km space, including rocky shore, coastal hill forest, rich sand and mudflats. It also holds Singapore's only seagrass lagoon,

where families of dugong gather in the dusk to graze.

"In the beginning, the native life was devastated because of the uncontrolled walking and collecting," said Mr How Choon Beng, the National Parks Board Senior Outreach Officer for Pulau Ubin.

Now, good controls are in place to allow people full enjoyment of the unique creatures there, while protecting them. To prevent trampling from heavy feet, visitors walk along designated routes during low tide periods.

Volunteers point out the interesting animal life that can be invisible to the untrained eye, such as the ultimate upgraders — hermit crabs, which swap shells when their old homes get too cosy; or the leaf porter crab, which camouflages itself by carrying a leaf on its back.

There is also one of Chek Jawa's most memorable crea-

tures, the nodular sea star — almost 30cm in length, its rough surface covered in bumps, and coloured anything from dirty green to pink.

Further down near the mangroves, they can see the Nipah palm, whose leaves are used to make thatched roofs. Flesh from its young seeds is soaked in sugar syrup to create atap-chee.

Visitors on the fully-booked trips used to have a special guide. Priscilla, a wild boar hand-raised as a piglet by villagers, was a frequent companion on the tours until she died last year.

And to allow more people to enjoy the wonders of Chek Jawa, a walkway meandering along the coasts and into the mangroves, which will be completed by next year, will bring visitors up close to its inhabitants, without harming them.

Visitors who arrive on Ubin

also get to sample locally grown rambutans, jackfruit and durian, or feast on fresh seafood and cycle along the winding tracks.

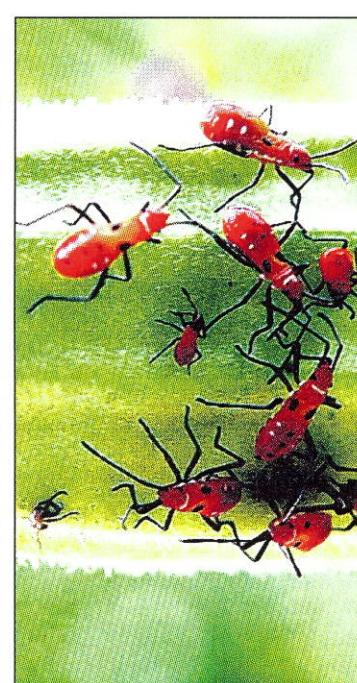
Through this, they learn quickly that the kampong isle is much more than Chek Jawa, and has rich pickings in terms of nature.

Ubin contains much the same life that Singapore would have had if there was little or no development. It provides a glimpse into Singapore's natural flora and fauna which can no longer be seen on the mainland, such as the last few wild populations of the red junglefowl.

Many hear the raucous calls of the Southern pied hornbills, or if they're really lucky, see their slow, laboured flight as they glide in formation overhead.

The large black and white

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RED ALERT: Colourful ants are some of the creatures that thrive in Chek Jawa.