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Dec 25, 2004

NUS researchers discover how crabs can thrive in acidic 'hell'

Scientists report breakthrough findings on tiny crabs' survival in boiling sulphur vents

By Chang Ai-lien
SCIENCE CORRESPONDENT

A TEAM of local researchers has solved the riddle of how tiny crabs manage to thrive in a home that would be poison to almost anything else.

The 4cm creatures live around hydrothermal vents in the shallow waters off Taiwan, where temperatures can exceed boiling point and pure bubbling sulphur creates a virtual acid vat.

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But the sulphurous plumes have actually sustained the crabs' lives - by killing microscopic zooplankton in the waters, which then rains down on the waiting pincers below like snow.

Twice a day, when the tides are slack, thousands of the creatures swarm out of their crevices to feast on the zooplankton, probably using small tufts of hair on their pincers to scoop them up.

At this time, when currents are weak or absent, the vent plumes travel vertically, killing anything in their path instantly, said National University of Singapore post-graduate student Ng Ngan Kee, one of the researchers involved.

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The dead matter then falls straight down to the crabs' doorstep, where the scavengers rush out to consume it, timing their feeding activities with the tidal cycles.

Working with colleagues from Taiwan's Academia Sinica, researchers from the NUS Department of Biological Sciences

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studied the *Xenograpsus testudinatus* crab for four years.

Together with Taiwanese scientists, Miss Ng discovered the new species of crab in 2000, when they were found in the gill nets of Taiwanese fishermen.

'Nobody knew exactly what kind of environment they lived in until our team members dived in the area and discovered the hydrothermal vents off Kueishan Island in north-east Taiwan,' she said.

Almost nothing was known about the creatures previously, and the breakthrough findings have been highlighted in the prestigious scientific journal *Nature*.

'This opportunity feeding behaviour by *Xenograpsus* crabs, which to our knowledge has not been seen in any other hydrothermal organism, represents a remarkable adaptation to their nutrient-poor environment,' wrote the authors in their report.

Next, they will be looking at how the crabs have adapted to life unscathed in an environment where human divers have to cover up or suffer acid burns on their skin.

'Life is harsh in this environment, yet they have certain mechanisms which allow them to survive,' said Miss Ng.

She hopes that the work will inspire others to look beyond the obvious in the hunt for new animal species.

'There are a lot of weird environments out there that nobody is paying attention to,' she said.

'Most of us just think that there's nothing there, and that's very sad, because they could hold valuable untapped resources.'

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