Echinoderm Readings

When the heat is on, starfish lose an arm to survive. New Scientist, 02624079, 6/8/2013, Vol. 218, Issue 2920

IN BRIEF
YOU can tell when a starfish is too hot -- it loses an arm. The remarkable behaviour is part of a strategy that may allow the animals to survive in warmer waters.
Sylvain Pincebourde at the Institute of Research on Insect Biology in Tours, France, and his colleagues collected 70 ochre starfish (Pisaster ochraceus) from the coast of California and housed them at temperatures ranging between 26 °C and 42 °C. By monitoring body temperature, they found that each animal's central disc was always 3 °C to 5 °C cooler than its five arms.
If its core temperature rose above 35 °C, the starfish
died. Its arms, however, could withstand those temperatures -- although if they remained at 35 °C for more than a few days, one or more arms typically fell off (Journal of Experimental Biology, doi.org/mpr).
Temperature regulation is a trait not normally associated with cold-blooded animals and it is not clear how the starfish influence the temperature in the different parts of their bodies. It is possible that they actively divert heat into their arms, which can release the heat into the water relatively efficiently because of their large surface area. This could explain why animals that are warm for an extended period lose some arms: by using them as heat sinks, the starfish may thermally damage their arms beyond repair in a bid to preserve their vital organs.

- **What did you learn after reading this brief article?**

Starfish eyes show them the way home. By: MacKenzie, Debora, New Scientist, 02624079, 7/13/2013, Vol. 219, Issue 2925

DID eyes evolve to guide animals home? Starfish seem to use the light-sensitive organs at the tips of their arms to recognise their reef if they stray from the rocks.
The blue sea star (Linckia laevigata) lives on shallow rock reefs in the Indian and Pacific oceans. It has light-sensitive cells in its arms, and prefers to come out at night to graze on algae.
What has not been clear, says Anders Garm at the University of Copenhagen in Denmark, is whether the cells simply detect ambient light levels or whether they form spatial images.
To find out, Garm collected healthy starfish and removed the arm-tip cells from some of them. When these starfish were placed on the sand near the reef, they scuttled off in random directions trying to get back to safety. Intact starfish, in contrast, always headed directly towards the reef, Garm told the Society for Experimental Biology meeting in Valencia, Spain, last week.
Starfish eyes are close to the suggested form for the first image-forming eyes, says Garm. Those first eyes may also have helped identify stationary objects such as a home reef, he says.
Starfish eyes are good enough to show them the way home
If they stray from the reef, starfish can use the light-sensitive organs at the tips of their arms to form images, helping them find their way home
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- **What did you learn after reading this brief article?**
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Ecos; Nov2013, Issue 189, p1-2, 2p
Pheromones to protect GBR from crown-of-thorns?

The USC researchers are Senior Lecturer Dr Scott Cummins, an Australian Research Council (ARC) Future Fellow in molecular andcellular biology, and USC Research Fellow Dr Tianfang Wang.

'Population explosions of crown-of-thorns starfish are one of the major causes of coral demise,' Dr Cummins said. 'This is a nativepest damaging a World Heritage asset, and requiring novel control measures.'He said 'feeding aggregations' of crown-of-thorns starfish could cause significant loss of coral cover on infested reefs, with individualadults consuming from 6 to 10 square metres of live coral per year.

'The oceans are a "smelly" world and odours in water can trigger critical behaviours,' Dr Cummins said. 'The ability to detect and respond to chemical signals is essential in all aspects of the lives of aquatic animals.'
He said pheromone communication in crown-of-thorns starfish could induce aggregations, allowing for specifically targeted control. 'Pheromone-based technologies to manage pests are used worldwide for many species of insects. Our goal is to demonstrate that a similar approach may be used in the marine environment to enhance the effectiveness of current control methods.'Dr Mike Hall of AIMS said a breakthrough in the manipulation of the animal's behaviour could lead to a new generation of control technologies for the crown-of-thorns. AIMS is a world leader in the biology of crown-of-thorns starfish and its new SeaSim marine aquarium complex will be used by researchers to understand the starfish's behaviour and identify its vulnerabilities.

- **What did you learn after reading this brief article?**