

Sea urchins recorded attacking and consuming predators far larger in size

A recent study published in the journal *Ethology* has shown that sea urchins are able to consume predators much larger than themselves. The study, led by researchers at the Norwegian University of Science and Technology and the University of Gothenburg, is the first of its kind to record this specific behaviour in the species.

While most preferentially feed on kelp, many sea urchin species are notorious for their indiscriminate feeding, sometimes even consuming plastic, and cannibalizing members of their own species. However, actively attacking and consuming predators is not something that urchins are known for.

“It was crazy,” explains Dr. Jeff Clements, lead author of the study. “After finishing a different experiment with sun stars, I put a huge sun star in a tank with green sea urchins. I was more concerned the sun star would attack the urchins but thought they would be safe as they were in a large group”.

When Clements returned to the lab the next day, he was shocked to find that the sun star had been decimated by the urchins.

The research team – including Clements, Dr. Fredrik Jutfelt and Dr. Sam Dupont – decided to put some additional sun stars in the tank and record what the urchins did. Through photographs and videos, the researchers documented a directed behaviour in which individual urchins mounted the tips of the sun stars’ arms and seemingly pinned them to the bottom of the tank.

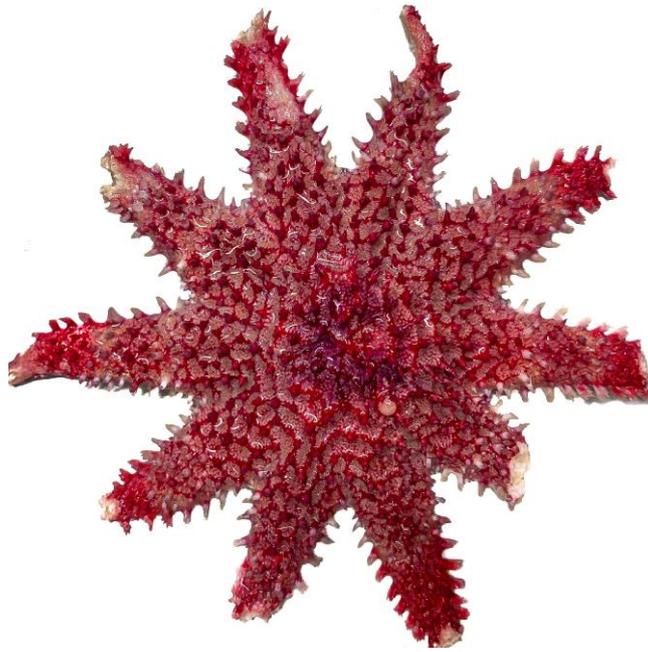
“Sensory perception in sea stars is largely derived from the arm tips, so consuming the arm tips would reduce the ability of sea stars to make an informed escape,” Clements explains. Additionally, having an urchin on the tip of an arm would make it difficult for a sea star to move that arm up and down.

Given this mode of attack by the urchins, the researchers termed this behaviour “urchin pinning.”

“What was most impressive during the observations was the seemingly cooperative fashion in which the urchins worked together to attack the sun stars – they really appeared to work together, and individual urchins did not fight one another for access to an arm tip.”

Clements noted that the urchins had been starved for about two weeks prior to the observations and lacked access to their normal diet of kelp. However, this scenario would be common in the wild, where urchins often overgraze entire kelp forests.

The findings not only document this predatory behaviour in green sea urchins for the first time, but also open the door for a wealth of future research into the predatory behaviour of sea urchins.



Caption: *Damage inflicted on an individual sun star by hungry green sea urchins*



Caption: *Close-up of a green sea urchin.*

Full paper

Clements, J.C., Dupont, S., and Jutfelt, F. (2021) "Urchin pinning": Behavioural observations reveal how hungry urchins actively prey upon their sea star predators. *Ethology*. doi: [10.1111/eth.13147](https://doi.org/10.1111/eth.13147).

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