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Coral Reef Studies

JAMES COOK UNIVERSITY
AUSTRALIA

**MEDIA RELEASE** **EMBARGO: 10.01 AEST (QLD) Wednesday 04 November 2020**

# Crown-of-thorns eat themselves out of house & home

A world-first study on the Great Barrier Reef shows crown-of-thorns starfish have the ability to find their own way home—a behaviour previously undocumented—but only if their neighbourhood is stocked with their favourite food: corals.

Australian researchers observed the starfish emerging from their shelters in the afternoons so they could feed on coral during the night before returning home at dawn.

"The crown-of-thorns starfish often partied all night, slept-in and only those with a well-stocked larder found their way home—so it's very much a teenager model of behaviour," said lead author Dr Scott Ling from the Institute for Marine and Antarctic Studies at the University of Tasmania.

"Their preferred prey is *Acropora* corals," said co-author Professor Morgan Pratchett from the ARC Centre of Excellence for Coral Reef Studies at James Cook University (CoralCoE at JCU). *Acropora* is an important coral species—for the past two million years they have been the building blocks of reefs across the world.

"When populations of *Acropora* dropped, the starfish didn't return home," Prof Pratchett said. "Their behaviour is directly linked to the local abundance of *Acropora*."

The results of the study show healthy reefs with a high cover of these corals may encourage crown-of-thorns aggregations and outbreaks. The outbreaks cause extensive, widespread and sustained coral loss throughout the Indo-Pacific region.

Similar examples of predator infestations driving environmental devastation include sea urchins overgrazing on kelp forests and coral reef fishes munching through patches of seagrass.

The researchers used *in-situ* time-lapse photography to track the movements of 58 starfish in the northern and southern Great Barrier Reef during an outbreak in 2015. In the absence of their preferred *Acropora* coral prey, starfish were typically homeless and instead roamed up to 20 metres per day.

"Unlike sea urchins that can switch diet once they overgraze kelp forests, results of the time-lapse monitoring indicate that the starfish will consume available *Acropora* and ultimately eat themselves out of house and home before dispersing in search of new feeding grounds," Dr Ling said.

Previous outbreaks on the Great Barrier Reef were recorded in 1962, 1979, 1993 and 2009. Though mass-coral bleaching due to global warming is now the greatest threat to coral reefs worldwide, the

combined impact of mass-bleaching and crown-of-thorns outbreaks is potentially catastrophic for coral reefs.

“By better understanding the behaviour of these starfish we can help prevent and control their outbreaks, which will help alleviate the pressures on coral reefs,” Prof Pratchett said.

**PAPER**

Ling S, Cowan Z, Boada J. Flukes B, Pratchett M. (2020). ‘Homing behaviour by destructive crown-of-thorns starfish is triggered by local availability of coral prey’. *Proceedings of the Royal Society B*. DOI: 10.1098/rspb.2020.1341

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