

Crown-of-thorns Starfish Predator Guide

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Known Crown-of-thorns Starfish (*Acanthaster*) Predators

by Leona Kustra, Coral Conservation Society

Link to online guide: <https://www.inaturalist.org/guides/21007>

This guide is based on the following studies:

1. Cowan, Z.-L., Pratchett, M., Messmer, V., & Ling, S. (2017). Known Predators of Crown-of-Thorns Starfish (*Acanthaster* spp.) and Their Role in Mitigating, If Not Preventing, Population Outbreaks. *Diversity*, 9(1), 7. <https://doi.org/10.3390/d9010007>
2. Kroon, F.J., Lefèvre, C.D., Doyle, J.R. et al. DNA-based identification of predators of the corallivorous Crown-of-Thorns Starfish (*Acanthaster* cf. *solaris*) from fish faeces and gut contents. *Sci Rep* 10, 8184 (2020). <https://doi.org/10.1038/s41598-020-65136-4>
3. K. Wolfe, A.A. Desbiens, F. Patel, S. Kwong, E. Fisher, P.J. Mumby, & S. Uthicke, (2025). eDNA confirms lower trophic interactions help to modulate population outbreaks of the notorious crown-of-thorns sea star, *Proc. Natl. Acad. Sci. U.S.A.* 122 (11) e2424560122, <https://doi.org/10.1073/pnas.2424560122>

The objective of this guide is to raise awareness of which fish and invertebrate species prey on Crown-of-thorns starfish (CoTS) in hopes of diminishing CoTS outbreaks and highlighting the delicate ecological balance required to conserve coral on Indo-Pacific reefs. The guide is ordered by organisms that feed upon CoTS in various CoTS life stages: **adult** CoTS; **juvenile** CoTS; and **larval** CoTS (planktonic sperm, eggs, or larvae).

Species level entries were derived from studies of known predators¹; DNA-based² identified predators and genus level entries of crabs that prey upon juvenile CoTS³.

Commonly observed species preying upon CoTS are: Giant Triton Snail; Humphead Maori Wrasse; Titan Triggerfish; Starry Puffer; Stars-and-stripes Puffer; Whitespotted Pufferfish; Blackspotted Puffer; Narrowlined Puffer; Spotted Porcupinefish; Yellowmargin Triggerfish; Orangestripe Triggerfish; Hawaiian Triggerfish; Orangeside triggerfish; Harlequin Shrimp; and Lined Fireworm^{4,5}. The order within the adult section are top predators of adult CoTS listed first: Humphead Maori Wrasse; Giant Triton Snail; Titan Triggerfish; Starry Puffer; Stars-and-stripes Puffer; Spotted Porcupinefish; and Yellowmargin Triggerfish.

When CoTS reach outbreak levels, an ecological imbalance occurs that threaten coral reefs and prevent their adaptation and recovery from mass bleaching die-offs⁶. As the climate changes,

warming seas cause the corals to bleach then die⁷. The Crown-of-thorns starfish then voraciously devour the few heat adapted coral survivors⁴. Following bleaching events remaining corals can be saved and secured by moving them out of the hot tub layer of warm water to deeper waters on elevated nursery tables that CoTS cannot climb onto⁸.

Considering the role predators of CoTS at various life stage play in constraining CoTS populations, reducing fishing pressure on these species is a local reef action that can be taken immediately which may reduce the impacts of CoTS⁹.

Citizen science efforts by to detect and monitor CoTS outbreaks may increase the detection range and provide incentive for local removal campaigns and be an effective complementary approach to long-term, government-led programs¹⁰. Recreational snorkelers or divers, artisanal or subsistence fishers can provide major contributions¹⁰.

Since the Coral Triangle region of the Indo-Pacific alone is home to more than 2000 species¹¹ of coral-reef-fishes, there are likely other species of fish and marine organisms that also feed on CoTS that are not included in this guide.

The author welcomes any comments and feedback and invites collaboration, contact on iNaturalist at [@lkustra](#) or on email coralconserve@gmail.com.

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Thanks to Dr. Adam K. Smith of Reef Ecologic for training in iNaturalist and how to create an iNaturalist guide. <https://reefecologic.org/>

Thanks to the authors of the three scientific articles (1–3) used to list the species in this guide and for the hours of research they devoted to detail which species prey upon CoTS.

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Predators of Adult CoTS



Humphead Maori Wrasse
*Cheilinus undulatus*¹



Giant Triton Snail
*Charonia tritonis*²



Titan Triggerfish
*Balistoides viridescens*³



Starry Puffer
*Arothron stellatus*⁴



Stars-and-stripes Puffer
*Arothron hispidus*⁵



Spotted Porcupinefish
*Diodon hystrix*⁴



Yellowmargin Triggerfish
*Pseudobalistes flavimarginatus*⁶



Bigeye Seabream
*Monotaxis grandoculis*⁴



Bigscale Soldierfish
*Myripristis berndti*⁷



Black-spotted Triton
*Lotoria lotoria*⁸



Giant Ball Corallimorph
*Paracorynactis hoplites*⁹



Harlequin Shrimp
*Hymenocera picta*¹⁰



Horned Helmet Snail
*Cassis cornuta*¹¹



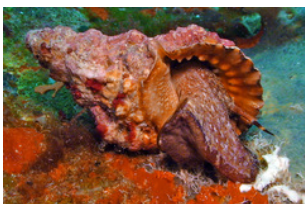
King Angelfish
*Holacanthus passer*¹²



Queensland Groper
*Epinephelus lanceolatus*¹³



Red Mud Lobster
*Neaxius glyptocercus*¹⁴



Red-mouthed Frogsnail
*Tutufa rubeta*¹⁵



Redthroat Emperor
*Lethrinus miniatus*¹⁶



Samoan Cardinalfish
*Nectamia savayensis*⁷



Smallmouth Squirrelfish
*Sargocentron microstoma*¹⁷



Spangled Emperor

Lethrinus nebulosus ¹⁸



Yellowtail Emperor

Lethrinus atkinsoni ⁷

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Predators of Juvenile CoTS



Giant Triton Snail
*Charonia tritonis*¹



Titan Triggerfish
*Balistoides viridescens*²



Stars-and-stripes Puffer
*Arothron hispidus*³



Yellowmargin Triggerfish
*Pseudobalistes flavimarginatus*⁴



Giant Ball Corallimorph
*Paracorynactis hoplites*⁵



Harlequin Shrimp
*Hymenocera picta*⁶



Queensland Groper
*Epinephelus lanceolatus*⁷



Red Mud Lobster
*Neaxius glyptocercus*⁸



Red-mouthed Frogspawn
*Tutufa rubeta*⁹



Redthroat Emperor
*Lethrinus miniatus*¹⁰



Yellowtail Emperor
*Lethrinus atkinsoni*¹¹



Kelp Crabs
*Epialtidae*¹²



Lined Fireworm
*Pherecardia striata*¹³



Pronghorn Spiny Lobster
*Panulirus penicillatus*¹⁴



Red Decorator Crab
*Schizophrys aspera*¹⁵



Round Crabs
*Xanthidae*¹⁶



Swimming Crabs
*Portunidae*¹⁷

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Predators of Larval CoTS



Bigscale Soldierfish
*Myripristis berndti*¹



Samoan Cardinalfish
*Nectamia savayensis*¹



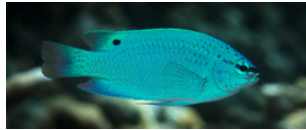
Ambon Damsel
*Pomacentrus amboinensis*²



Banded Humbug
*Dascyllus aruanus*³



Blackaxil Puller
*Chromis atripectoralis*⁴



Blue Demoiselle
*Chrysiptera cyanea*⁵



Blue-green Puller
*Chromis viridis*⁴



Bluehead Demoiselle
*Chrysiptera rollandi*⁶



Headband Humbug
*Dascyllus reticulatus*³



Lace Coral
*Pocillopora damicornis*⁷



Lemon Damsel
*Pomacentrus moluccensis*⁴



Oriental Butterflyfish
*Chaetodon auripes*⁸



Red Sea Half-and-half Chromis
*Pycnochromis dimidiatus*⁹



Red-dotted Guard Crab
*Trapezia cymodoce*¹⁰



Rusty Guard Crab
*Trapezia bidentata*¹¹



Scissortail Sergeant
*Abudefduf sexfasciatus*¹²



Spiny Puller
*Acanthochromis polyacanthus*⁴



Staghorn Damsel
*Amblyglyphidodon curacao*¹³



Two-tone Chromis
*Pycnochromis margaritifer*⁶



Yellow-spotted Guard Crab
*Trapezia flavopunctata*¹¹



Yellowtail Demoiselle

Neopomacentrus azysron ¹⁰

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