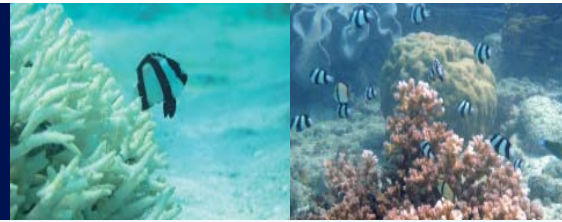


Effects of climate change on coral-dwelling fish populations



Global climate change has caused extensive and widespread habitat degradation in coral reef ecosystems through impacts such as coral bleaching. Bleaching events have been shown to have negative effects on abundance and diversity of coral-dwelling fish. While the decline in abundance of coral-dwelling fish after bleaching events has been documented, it is not known if this is due to movement to non-bleached coral or due to increased *in situ* mortality. To examine the impacts of coral bleaching on coral-dwelling fish, Darren Coker and his colleagues, Morgan Pratchett and Philip Munday, performed aquarium experiments to directly test whether the condition of coral habitat influences predation of damsel.

How does coral bleaching impact predator-prey interactions for coral-dwelling fish?

Coral bleaching may have different effects on predation rates. Firstly, predation rates on coral-dwelling fishes may decline if predators avoid bleached corals. Secondly, coral dwelling damselfishes associated with white-bleached coral hosts may be visually conspicuous compared to unbleached, dead, or algal-covered colonies, and thus more susceptible to predation. Moreover, coral-dwelling fishes may become increasingly susceptible to predation after host coral bleaching if they exhibit weaker associations with degraded coral hosts. These effects on predation rates were examined with aquarium experiments to test the effects of bleaching on predator and prey habitat associations as well as directly testing whether the condition of coral habitat influences predation of coral-dwelling fish. The aquarium based experiments in this study demonstrate that while the predator, *Pseudochromis fuscus*, prefers to associate with live coral or algal-covered habitat, it was found to strike at prey associated with bleached and recently dead corals more than fish associated with healthy coral habitats. This is likely due to the increased visual prominence of prey against bleached and dead corals. Additionally, prey fish may alter their behaviour when associated with bleached and dead coral such as declines in the strength of their habitat associations. Direct measurement of mortality rates in prey species, *Pomacentrus moluccensis* and *Dascyllus aruanus*, demonstrated a pattern of increasing mortality with increasing degradation of coral hosts (healthy<bleached<recently dead<algal covered).

Why is this research important?

It is predicted that global climate change will result in increased bleaching events in coral reefs. These events cause extensive coral reef habitat degradation and loss which may result in decreased abundance of coral-dwelling fish. This study is an important step in understanding the direct impacts of coral bleaching on predation of coral-dwelling fish. This study shows that predation may have a significant influence on the abundance of coral-dwelling fish after host coral bleaching which may influence prey populations as well as have flow-on effects in trophodynamics of coral reef ecosystems.

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References:

Coker, D.J., Pratchett, M.S. and P.L. Munday. 2009. Coral bleaching and habitat degradation increase susceptibility to predation for coral-dwelling fishes. *Behavioural ecology* 20: 1204-1210



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