

Coral reef ecology: lesson 2 of 3

Competition and grazers

Why reefs need the fish that
eat algae



A parrotfish grazing. Photo: MCP



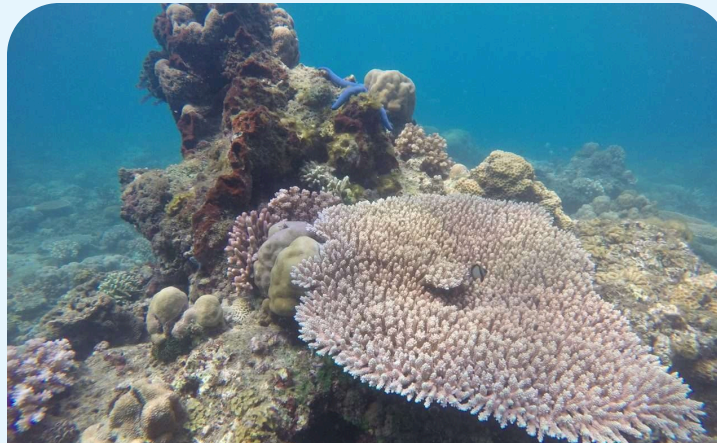
A battle for space

Space on a reef is limited, and corals and algae compete for it.



Sweeper tentacles

Some corals sting neighbours that grow too close.



Overgrowing

Faster corals and algae grow over slower ones.



Shading

Tall table corals block light from corals below.



The grazers

Herbivores keep algae in check and clear space for young corals to settle.



Parrotfish

Scrape algae off dead coral.



Surgeonfish and rabbitfish

Crop turf algae short.



Sea urchins

Graze algae at night.



When the grazers disappear: Jamaica

**over
50%**

coral cover in the late 1970s

**under
5%**

coral cover by the early
1990s

**over
90%**

cover of fleshy seaweed

Overfishing had already removed most grazing fish. Then a hurricane hit, and in 1983 disease killed the sea urchins, the last grazers. Seaweed took over.



But phase shifts are not everywhere

A later study of more than 1,800 reefs found seaweed took over far less often than feared: only 4% of reefs worldwide were dominated by seaweed, and just 1% in the Indo-Pacific.

Keeping grazers healthy is one reason reefs in the Philippines can still recover.



The grazer game

1. Your board is a 10 x 10 reef: pink squares are coral, green are algae, pale are bare.
2. Each round, every algae square spreads to one bare or coral square next to it (roll a dice for the direction).
3. Then each grazer clears one algae square, turning it bare. Bare squares next to coral become coral every second round.
4. Play 6 rounds with 2 grazers, then again with 8. Count the coral each round.



Talk about it

How many grazers did it take to keep the coral winning?

Why did Jamaica's reefs collapse when the urchins died, but not before?

What does this mean for fishing parrotfish?

Next time: resilience



Photos and sources

Photos: parrotfish, table coral and survey divers by MCP. Game board drawn for this lesson. All illustrations drawn for this lesson by Marine Conservation Philippines.

Sources:

- Hughes, T.P. (1994). Science 265: 1547-1551.
- Bruno, J.F. and others (2009). Ecology.

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