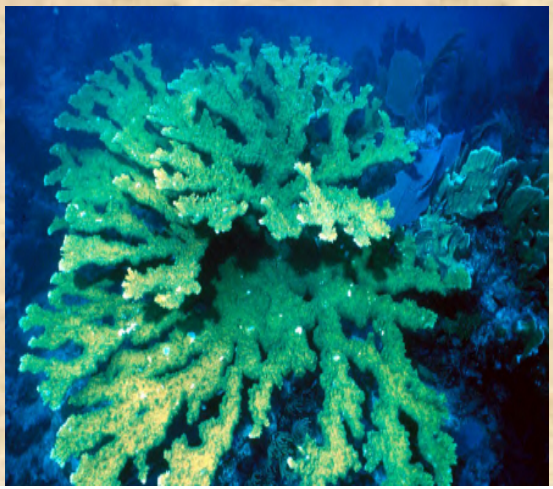
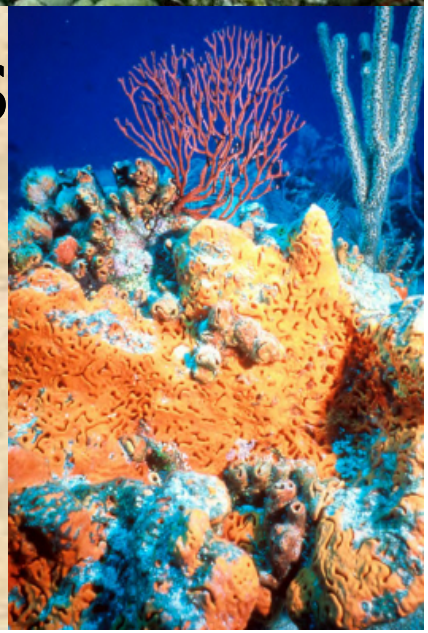
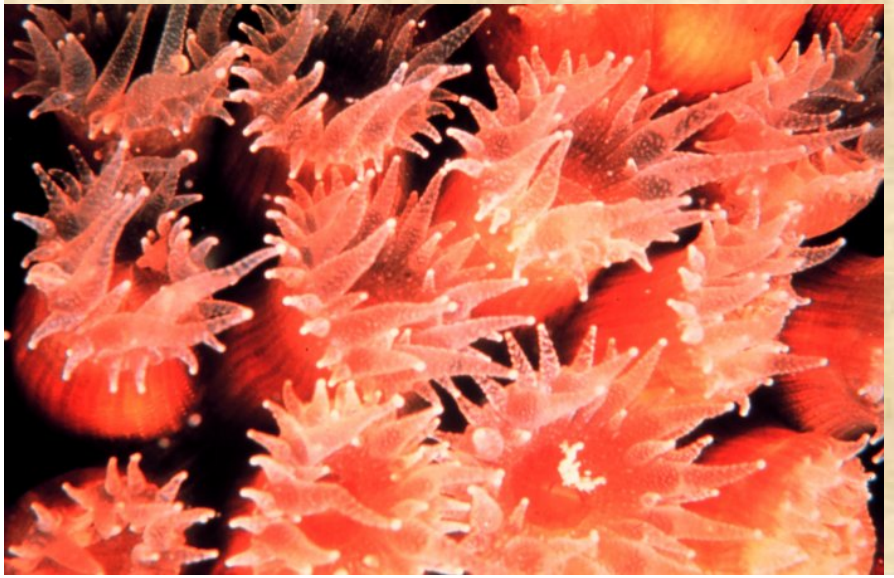
Corals

Landlords of the Reefs





What should you know about corals?

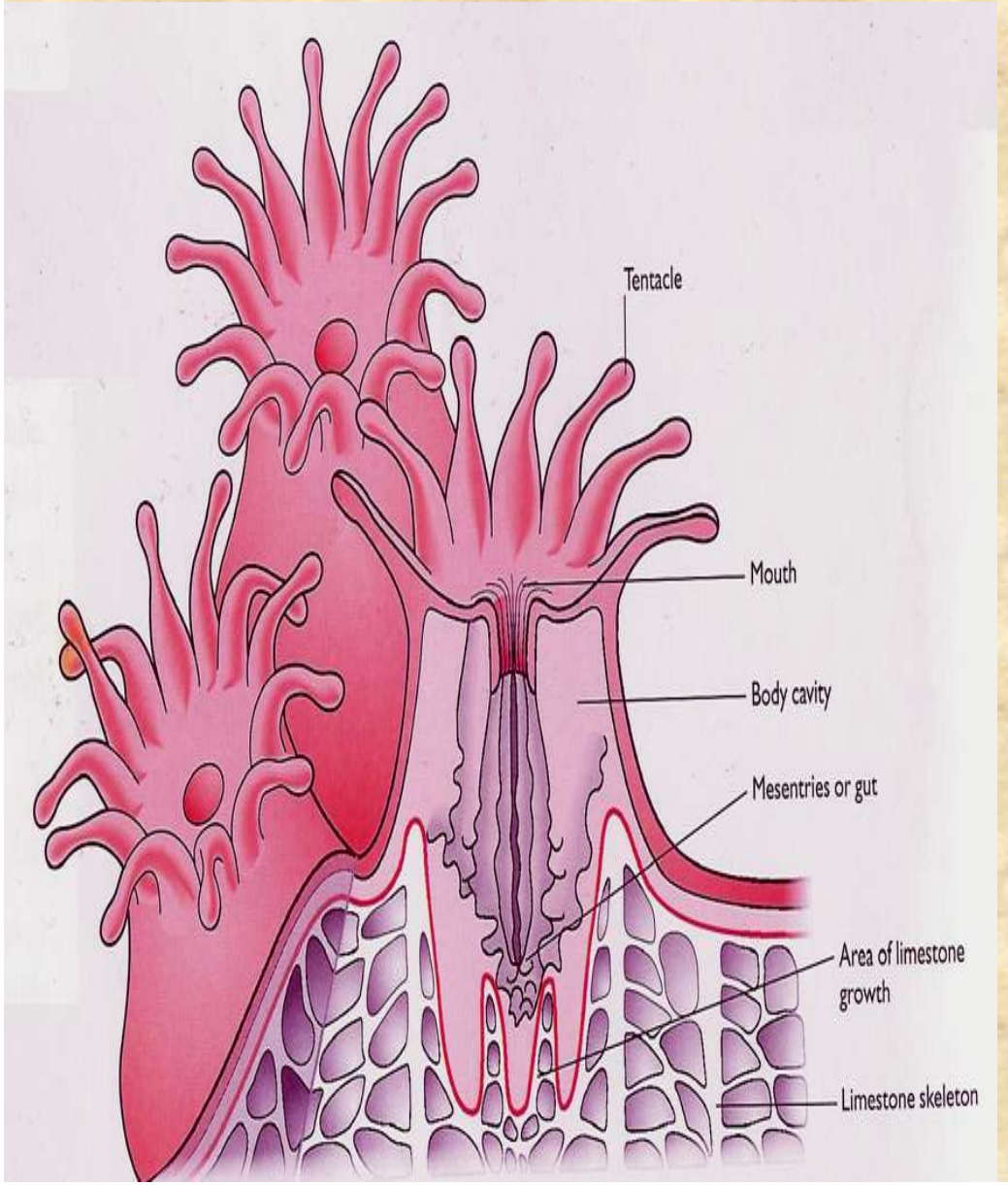


- They are animals.
- Algae (Plants) live inside them.
- Corals are **two types**:
  1) **Soft corals**.
  2) **Hard corals** (build coral reefs).
- They are made of small polyps.

Hard Corals
The Reef Builders

- Polyps build hard limestone cups around their bases.
- The cups cement together to make a coral colony.
- Reefs are made of hundreds of hard coral colonies next to and on top of each other.

What's a Polyp?



- Tentacles are covered with **nematoblasts** (stinging cells).
- Polyps make their own limestone cup to hide inside it during the day.
- At night, polyps come out to catch and **feed on planktons**.

During night

During day

Zooxanthellae
Algae - Coral Polyps symbiosis

- Zooxanthellae (algae) live inside the polyps.
- Zooxanthellae give corals their color.
- Since algae are plants, they use sunlight and CO_2 to make organic nutrients by photosynthesis.

Symbiosis:
So Happy Together

- Two organisms living together and helping each other is called ***symbiosis***.
- Zooxanthellae make oxygen, remove the polyp's wastes, make food for the polyp from photosynthesis and increase calcification rate of corals.
- Coral polyps protect the zooxanthellae, release CO_2 and provide it with necessary nutrients from their own waste.

What are zooxanthellae?

- Algae that live in the coral polyp's surface layer.
- It increases the calcification rate of the polyps.
- Give corals their beautiful color (without them corals become white; phenomenon known as **coral bleaching**).

Coral Bleaching

- Coral Bleaching is a **stress condition** that leads to **breakdown or loss of zooxanthellae**.

- **What causes bleaching**?

1- **Increase in water temperature** for long periods (global warming).

2- Exposure to **UV radiation** from sunlight.

3- **Low salinity** or high water **turbidity**.

4- **Exposure to air** during very low tides.

5- **Pollution**.

Coral Bleaching

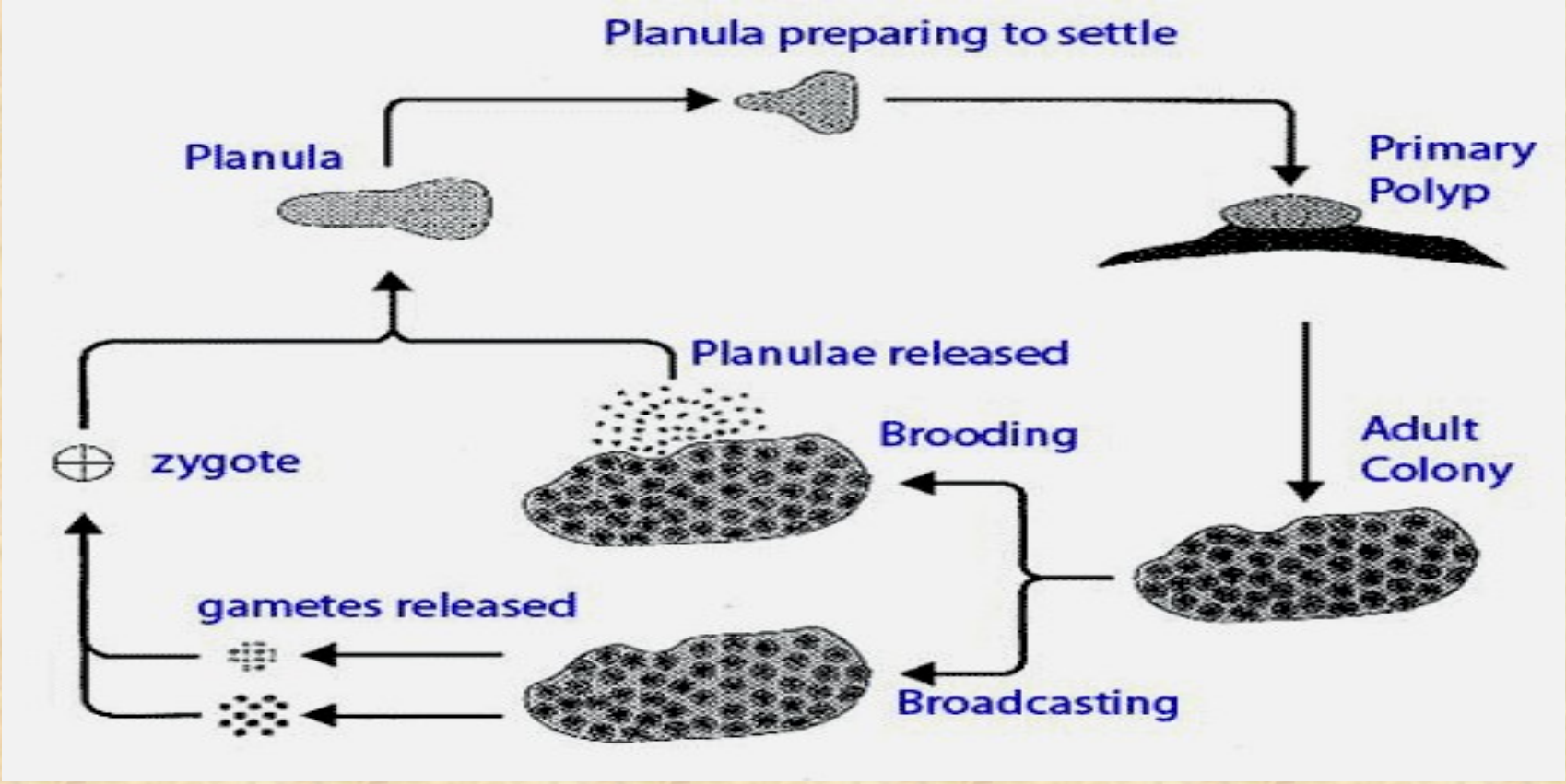
Healthy coral with algae

Bleached coral with no algae

Reproduction of corals:

- **Asexual reproduction** by budding.
- **Sexual reproduction:**

Corals may be **hermaphroditic** or **dioecious**. Sperms are released into the water, taken in by polyps, fertilization may occur in the female's gastrovascular cavity (**Brooding**) or in water (**Broadcasting**), and **planula larvae** are released.



Limiting Factors for coral growth

- **Warm water temperature** (the current problem of global warming affects coral growth).
- **High light intensity** (symbiosis with algae).
- **Stable water salinity**.
- **Low turbidity** (suspended sediments affect coral growth).
- Water currents and **wave action**.
- Rise and fall of sea level (**tide**).

Reef-building (Hermatypic) corals

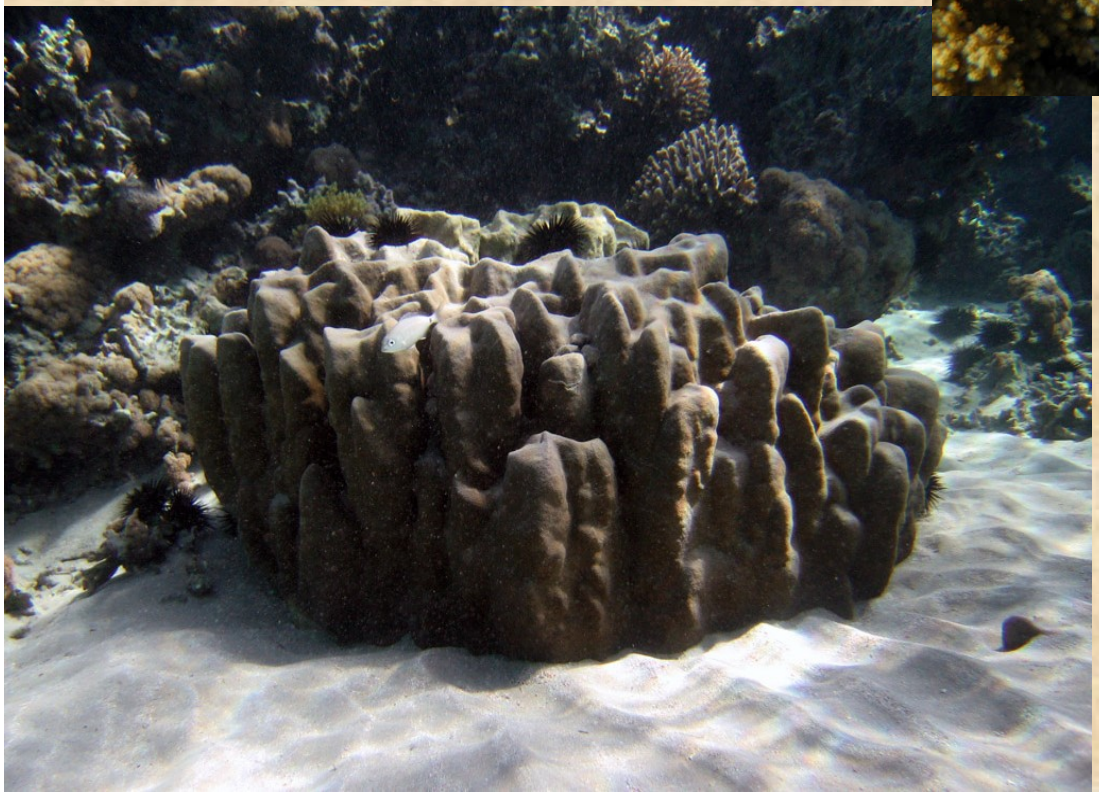
- Belong to the Phylum **Cnidaria**, Class **Anthozoa**, Order **Scleractinia**.
- Secrete skeletons of **calcium carbonate**.
- Formed of colonies of many similar polyps.
- Their **growth form** may be:

1- **Branching form**: low calcium carbonate and rapid growth (10 cm/year).

2- **Massive form**: high calcium carbonate and slow growth (1 cm/year).

- Have abundant symbiotic zooxanthellae**.**

Branching corals



Massive corals

Hermatypic and Ahermatypic corals

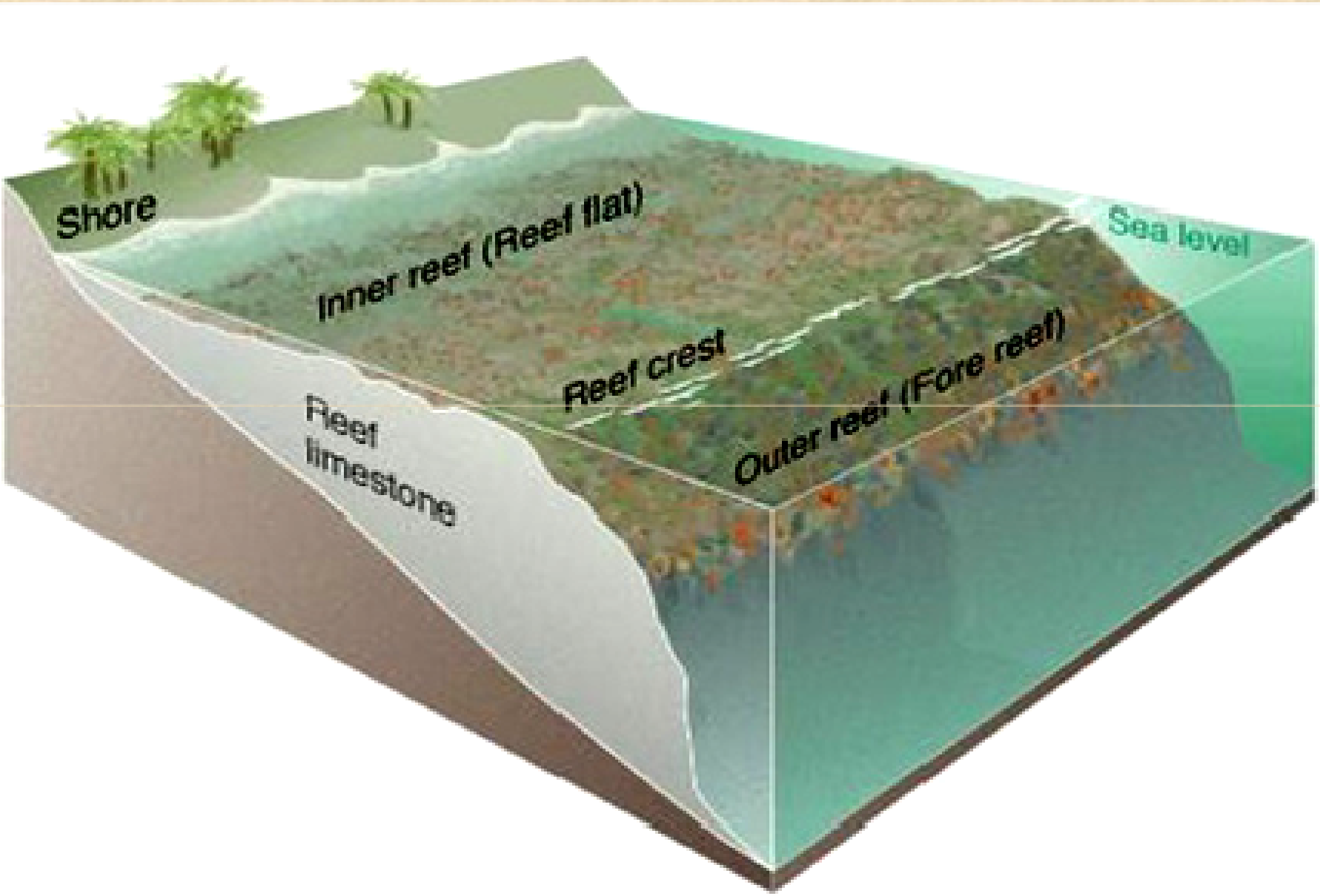
- **Hermatypic corals:**

Reef builders, have many zooxanthellae and high calcification.

- **Ahermatypic corals:**

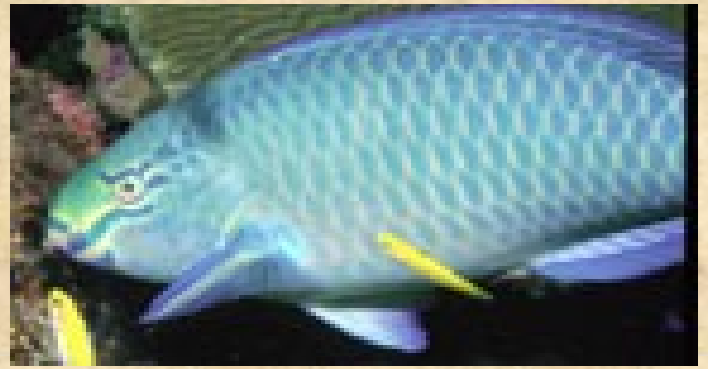
Not reef builders and have low calcification.

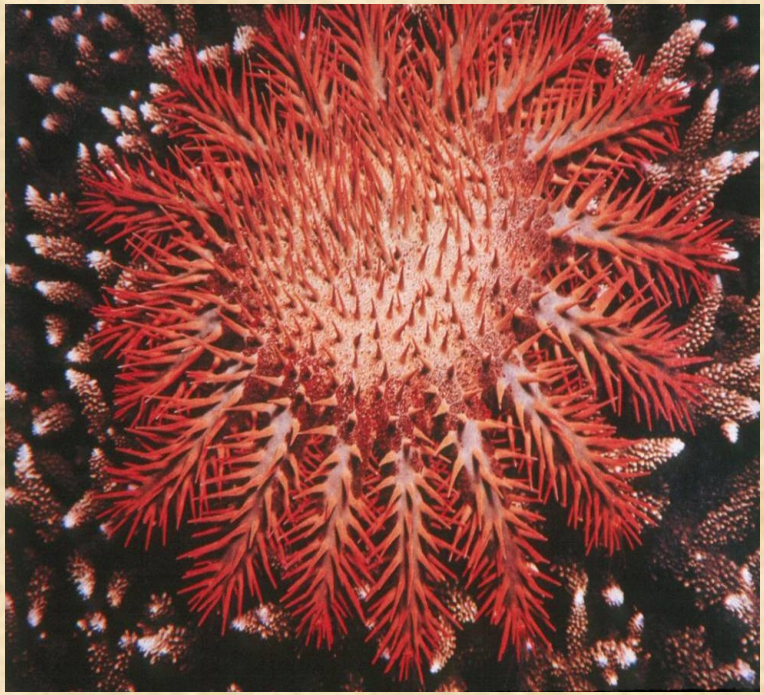
Coral reef Zonation

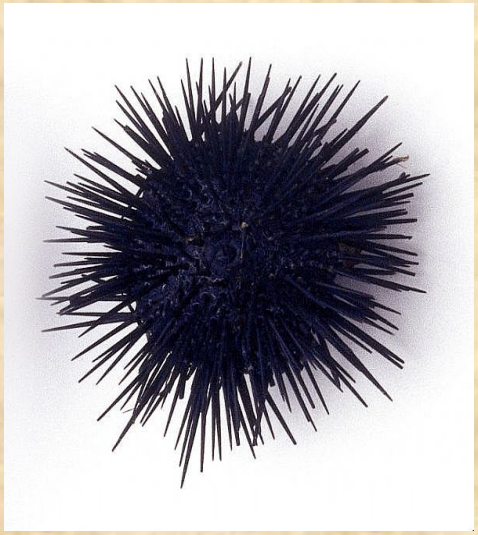


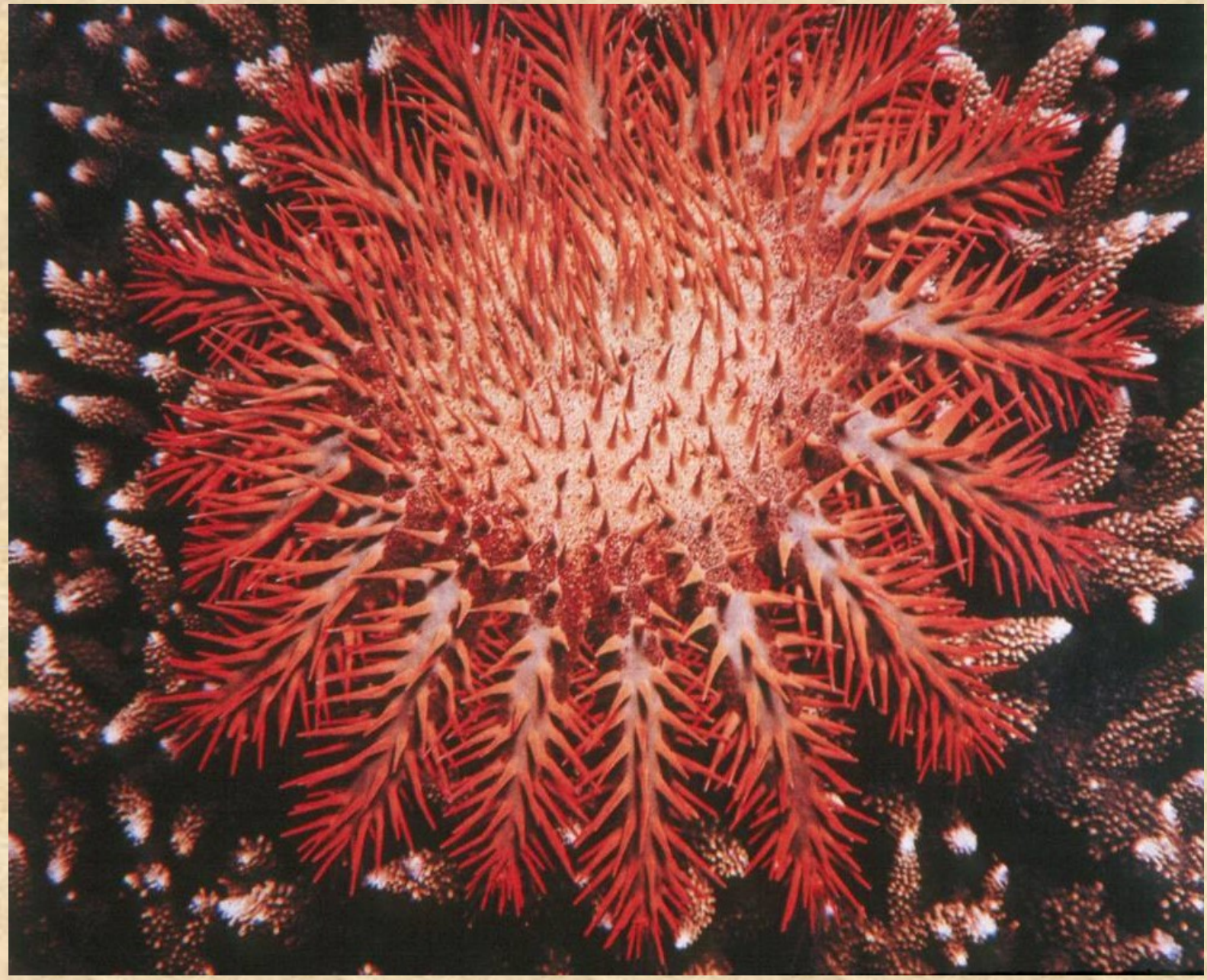
Predators of corals:

- **Crown of thorns starfish (*Acanthaster*):** Feed on polyps. One starfish can feed on up to 20 km^2 of coral per year.
- **Triton snail:** feed on polyps.
- **Parrot-fish:** feed on polyps.
- **Sea Urchins:** feed on algae.





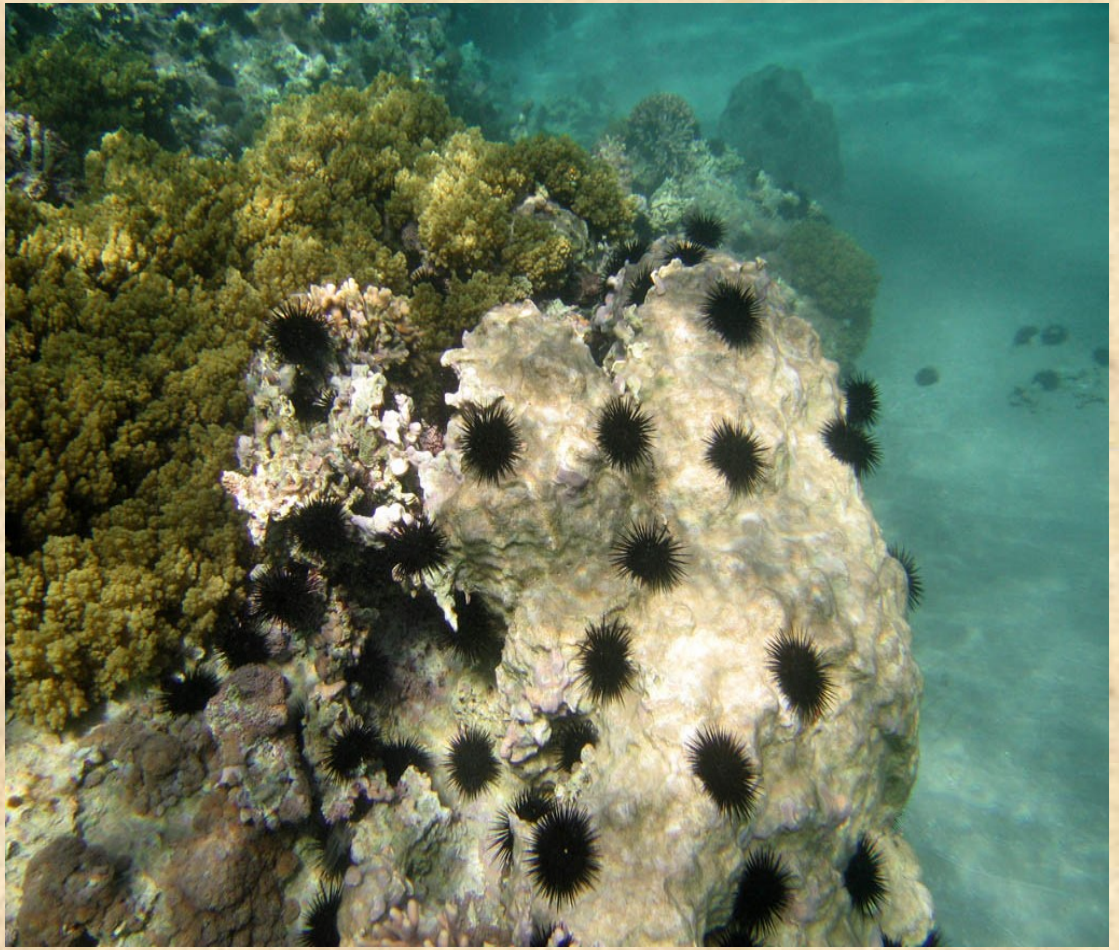




Crown of thorns starfish (*Acanthaster*)

Triton Snail

Sea Urchins



Parrot fish