

Marine Communities

Factors

- The physical and biological aspects of living environment define how and why organisms form communities and live symbiotically.
- Physical factors like temperature and salinity determine stenothermal to eurythermal and stenohaline to euryhaline responses.

		Temperature Range	
		narrow	wide
Salinity Range	wide	Stenothermal Euryhaline	Eurythermal Euryhaline
	narrow	Stenothermal Stenohaline	Eurythermal Stenohaline

- As schematically illustrated above, four types of marine living environments can be thus identified: (a) eurythermal and euryhaline (e.g., estuaries), (b) eurythermal and stenohaline (e.g., temperate zone coastal ocean), (c) stenothermal and stenohaline (e.g., coral reefs) and (d) stenothermal and euryhaline (circum-Antarctic waters).

Biological factors include crowding, predation, grazing, parasitism, shading from light, waste substances and the competition for limited oxygen, e.g., mutualistic versus commensalistic and parasitic forms of symbiosis.

Types

- **Rocky Intertidal zones:** One of the earth's most densely populated areas, presents problems of coping with alternating high and low tides and the resulting wave shock and intense competition for space and resources. The favorable factors here include (a) large quantities of food and (b) large number of habitats and niches.
- **Sand and cobble beach** communities face intensified rigors of intertidal zone.
- **Salt marshes and estuaries** have intense productivity, mostly from spermatophytes, helped by reduced wave shock and varied salinity.
- **Open oceans:** Most (~85%) of the oceanic biological productivity is concentrated in the top 200 m.

Symbiosis

Symbiosis (SYM for 'with' + BIOS for 'life') refers to the interdependence often seen between different species. It is

- **Mutualistic**, when both, the symbiont and the host benefit, e.g., the autotrophic dinoflagellate zooxanthellae living within the coral tissues gets shelter and CO₂ by giving the host animal, hermatypic coral, a built-in source of carbohydrates.
- **Commensalistic**, when the symbiont benefits but neither hurts nor helps the host, e.g., the tiny pea crab living inside mussel shells feeds on the particles brought inside by the mussel's normal eating or respiratory activities.
- **Parasitic**, the commonest kind, occurs when symbiont lives in or on the host at the host's expense, e.g., the long (up to 7 m) but pencil thin nematode worms living inside the whales.

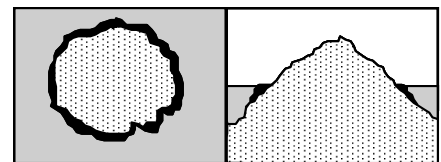
Learn more about symbiosis at the URL:

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/S/Symbiosis.html>

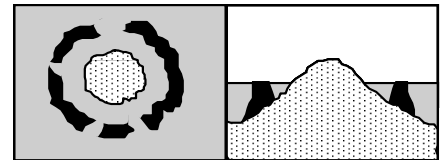
The reef building corals

- occupy barely 2% of the tropical oceans but account for over 50% of the biological productivity of tropical waters,
 - are cnidarians, mostly ant-sized and hermatypic and therefore sessile benthos, whose bodies symbiotically carry masses of the unicellular and autotrophic dinoflagellates zooxanthellae, that thrive in the shallow, warm and salty waters off volcanic islands (hence away from the freshwater sources), and
- gradually build upwards as the volcanic island sinks, so advancing from the fringing reefs to barrier reefs and, finally, atolls.

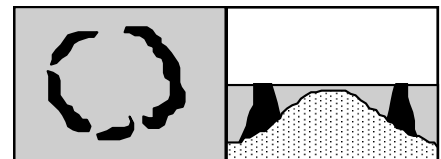
Fringing Reef



Barrier Reef



Atoll Reef



■ Reef ▨ Volcanic Island □ Ocean

For more information on the reef building corals, try the URL:

<http://www.coralreef.noaa.gov/>