

CORALS in Hainan, China

Corals are marine invertebrates (animals without a backbone) related to anemone and jellyfish. Corals are found worldwide and are of high importance in many ways, for example as habitat for marine organisms, natural barrier that offers shoreline protection, tourist attraction or as filter that improves water quality. However, 75% of the coral reefs worldwide are at risk. They are threatened by extreme weather events and human activities resulting in, e.g., pollution, coral mining, bioinvasion and diseases.



© H. Zhao

FACTS

- **Hard or hermatypic corals** create calcium carbonate skeletons and primarily build reefs. They are found in tropical regions.
- **Soft or ahermatypic corals**, that are often brightly colored, do not build these skeletons, but spiky structures, called spicules. They do not build up reefs, but can inhabit coral reefs. With their **tentacles** some corals capture their own food.
- Most hard corals host the microscopic unicellular algae called **zooxanthellae** in their tissues. This algae takes the coral's metabolic waste products and carries out photosynthesis providing the produced organic material as food to the corals. Due to the need of sunlight, they are restricted to shallow water.

Why are corals important?

Corals provide habitats for marine species by offering food, shelter and breeding sites. Corals also form a barrier along coasts and around islands offering shoreline protection by dissipating wave energy and minimizing coastal erosion. As filters coral reefs help to improve water quality. Coral reefs play a role in managing carbon dioxide levels. They also support fishing and tourism industries as reefs are famous attractions. As a source of new medicines to treat cancer and other illnesses, coral reefs have a huge pharmaceutical value and are referred to as medicine chests of the sea.

Each individual coral is called a polyp.

Most of the larger coral reefs that we find today are estimated to be between 5,000 and 10,000 years old.



Reefs compete rainforests in the amount of biodiversity they support. They cover less than 1 % of the ocean floor, but host 25 % of marine species



Photos:
H. Zhao,
Y. Wang

Interesting links

<https://coralreef.noaa.gov/education/coralfacts.html>
<http://www.pcrf.org/reeffacts.php>
<https://www.icriforum.org/about-coral-reefs/what-are-corals>

References

Hughes et al. 2017. Coral reefs in the Anthropocene. *Nature* 546: 82-90.
Xiang et al. 2018. Occurrence and distribution of Polycyclic aromatic hydrocarbons (PAHs) in seawater, sediments and corals from Hainan Island, China. *Ecotoxicology and Environmental Safety* 52: 8-15

What are the threats?

Currently, **three quarters** of the coral reefs worldwide are at risk and **50 % of them could be destroyed** by 2030. Corals are threatened by **various** processes and human activities:

- Extreme weather events such as storms;
- Climate change, associated with increased water temperature, elevated light levels, and sea level rise;
- pH changes through ocean acidification;
- Agricultural and urban runoff increasing nutrients, herbicides, sediment load and turbidity;
- Organic pollutants, oil spills, marine debris such as microplastics. Our study in Hainan has found that PAH (polycyclic aromatic hydrocarbon) concentrations value in corals markedly higher than in ambient seawater and sediments.

Coral bleaching

In recent years, the frequency of coral bleaching events has **increased**. In 2016, about 36 % of corals reefs worldwide have experienced major bleaching.

When corals are **stressed**, they temporary or permanently dispel the **zooxanthellae** that also give them much of their color. Without zooxanthellae, these corals turn white and start to **starve**. If the stress persists, bleached corals can even die.



Bleaching corals in Hainan

The coral abundance along the Chinese mainland and Hainan island has declined by at least 80 % over the past 30 !

Take home messages

- Corals are marine invertebrates. Hermatypic corals primarily build reefs, while ahermatypic can inhabit them
- As hotspots of marine biodiversity, shoreline protectors, water filter or source of income for tourism and fishing industry, corals strongly benefit society and the environment
- Many factors like increased water temperature, ocean acidification, pollutants, overfishing or coral mining pose serious threats to corals and have already put 75% of the worlds reefs at risk

Imprint

Editor

Prof. H. Zhao, Prof. Y. Wang, Dr. F. Günther, W. Schütte, Dr. J. Zhang
Leibniz Centre for Tropical Marine Research
Fahrenheitstr. 6, 28359 Bremen

Webpage

[http://ecoloc.lei
bniz-zmt.de/](http://ecoloc.lei
bniz-zmt.de/)

