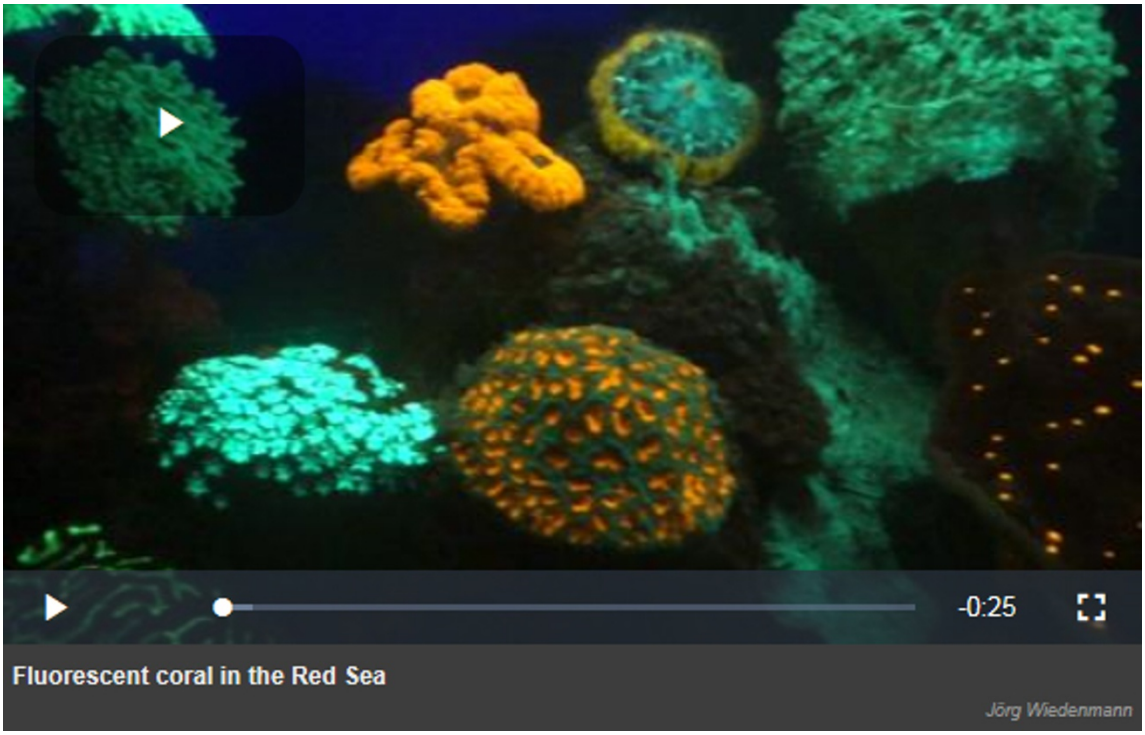
Radiant reefs found deep in the Red Sea

Corals may glow yellow, orange and red to improve light conditions for algae.

Allie Wilkinson

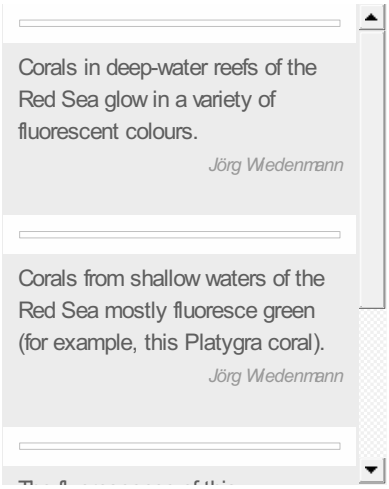
24 June 2015



Shallow-water corals in the Red Sea glow green, but marine scientists have discovered corals some 50–60 metres below the surface that take on dazzling hues of yellow, orange and red.

The study is the first to find such an array of fluorescent colours in deep-water corals, says Jörg Wiedenmann, a molecular biologist at the University of Southampton, UK, and suggests that corals at different depths may change colours because they use fluorescent proteins for different purposes. He is a part of a team that reports its findings today (24 June) in *PLoS ONE*[1].

In shallow waters, corals are known to use fluorescent proteins as a sunscreen to shield their symbiotic algae, zooxanthellae, which photosynthesize to provide the corals with food. The proteins soak up harmful ultraviolet rays and re-emit green light. But less sunlight penetrates deeper waters — suggesting that corals there glow red, yellow and orange to get more light to their algae for photosynthesis. “It may well be that these fluorescent proteins help the corals to improve the light environment at depth,” says Wiedenmann.



Corals in deep-water reefs of the Red Sea glow in a variety of fluorescent colours.

Jörg Wiedenmann

Corals from shallow waters of the Red Sea mostly fluoresce green (for example, this Platygra coral).

Jörg Wiedenmann

In the laboratory, the researchers showed that some of the corals still produced their pigments in complete darkness — backing up the idea that pigments in deep-water corals serve to help the animals deal with low-light conditions. If that hypothesis is correct, then “some of the things that we’ve learned about these mechanisms might give us insight into how corals deal with other types of stressful conditions”, says David Kline, a coral reef ecologist at the Scripps Institution of Oceanography in La Jolla, California.

Deep-water coral reefs might help scientists too, Wiedenmann says: they could be a source of naturally occurring fluorescent pigments, which biomedical researchers can use as markers in imaging studies. The researchers found a high diversity of red fluorescent proteins, which are particularly useful because they emit light of longer wavelengths, which is better able to penetrate cells and tissues. One other study has been conducted on deep-water corals in Hawaii, but it found only cyan and green fluorescent proteins[2].

Nature | doi:10.1038/nature.2015.17840

References

1. Eyal, G. *et al. PLoS ONE* **10**, e0128697 (2015).
2. Roth, M. *et al MEPS* **521** 63–79 (2015).