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# Coral reefs are evolution hotspot

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The reefs are centres of evolution as well as biodiversity

**Coral reefs give rise to many more new species than other tropical marine habitats, according to a new study.**

Scientists used fossil records stretching back 540 million years to work out the evolution rate at reefs.

They report in the journal *Science* that new species originate 50% faster in coral reefs than in other habitats.

The team says its findings show that the loss of these evolution hotspots could mean "losing an opportunity to create new species" in the future.

Coral reefs harbour a huge number of marine species - they are often likened to rainforests in terms of their biodiversity.

But they also provide a "pump of new marine species", according to Wolfgang Kiessling the scientist from Humboldt University in Berlin, Germany, who led this study.

He and his colleagues examined the fossil record to find the earliest evidence of benthic creatures - animals that live on the seafloor.

These creatures provide a good record of evolution. They remain on the seafloor once they die, and are often fossilised along with some of the remains of their original habitats.

This team of scientists looked for the earliest fossils from each benthic genus, or group of species, in the fossil record.

"We checked when and where each genus first occurred, explained Dr Kiessling. "So for example, if the earliest fossils were 300 million years, we asked: 'Did it occur in a reef or outside'."

He and his colleagues had access to a record stretching back to the Cambrian explosion - when the vast majority of complex organisms are believed to have emerged more than 540 million years ago.

This huge data set was compiled by an international project called the Paleobiology Database, which was started in 2000.

"We had the best documentation of the fossil record at our fingertips," Dr Kiessling told BBC News. "And there was also the geological context there, so we knew where each species occurred.

"Our study shows that reefs are even more important than currently assumed. They are not only ecologically important for the marine environment, but also in an evolutionary sense."

But Dr Brian Rosen, a zoologist at the Natural History Museum in London, UK, warned that the accuracy of fossil records alone was "notoriously difficult to gauge from the literature".

He added that it could be useful for independent experts to re-examine some of the fossilised creatures.

Data "generated by direct examination of the specimens themselves by the relevant taxonomic specialists" is more reliable when it comes to working out important evolutionary patterns, he said.

**“ If we lose reefs we lose an opportunity to create new species by evolutionary processes**

Wolfgang Kiessling

Humboldt University, Berlin



Giant clams are fossilised with the remains of their coral reef habitats

Carl-Gustaf Lundin, head of the marine programme at the International Union for Conservation of Nature (IUCN) said that this was a "very welcome paper".

"Studies like this provide conclusive evidence that reefs are centres of marine biodiversity," he told BBC News. "And now we see their importance in the evolutionary history of the planet."

He added that currently the planet was losing 2% of its reefs each year, mainly because of increasing ocean temperature bleaching and stunting the coral's growth. And ocean acidification making it more difficult for corals to build their skeletons.

Dr Kiessling said: "If we lose reefs we lose [an] opportunity to create new species by evolutionary processes."