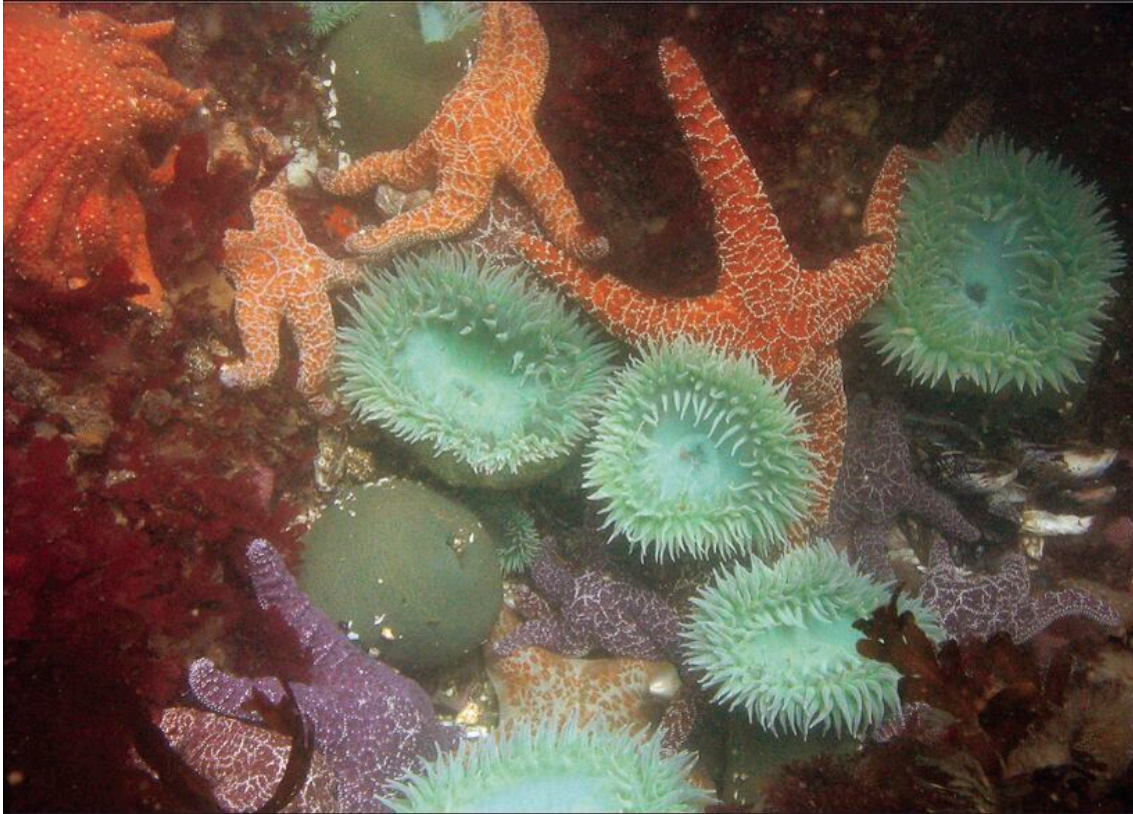


Can the ocean adapt to rising temperatures?

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Rising temperatures, possibly from man-caused climate change, are putting ocean life at risk. Maybe.

During a presentation Thursday to celebrate the 50th year of Oregon Shores, Steve Palumbi, a biologist and author, said studies have shown some ocean animals have the ability to evolve and adapt to the changes in the water.

Palumbi, who also works as a professor at Stanford University, was invited to talk about the Extreme Life of the Sea, which is also the title of a book he and his son wrote.

“I’ve spent a lot of time on the Oregon coast,” he said. “It’s a fabulously beautiful place.”

Palumbi started off by talking about the extreme life in the ocean. For example, some rockfish can live to be 120 years old. And some fish can “fly.”

“Fish and marine life are amazing creatures,” Palumbi said. “Flying fish are only fast out of the water, and they don’t actually fly, they glide.”

Palumbi said the fish evolved to fly as a means of survival because that is their only way to escape faster hunters.

“What are really the fastest fish?” Palumbi asked. “We eventually come down to the billfish. Swordfish and marlins are the fastest fish in the ocean. They can get up to 40 miles per hour. These marlins and billfish are not only swimming at 40 miles per hour, they’re eating and 40 miles per hour.”

As the water temperature has risen, going up 1.5 degrees over the last 100 years, one thing that has intrigued marine biologists are animals that can survive in the hottest water. In the ocean, that’s near the hydrothermal vents off the west coast.

Palumbi said red tube worms thrive in the hot water, and one specific worm, the Pompei worm, is stunning to scientists. The worm lives at the end of the underwater smoker chimneys, with half its body inside and half outside. One end of the worm is at 176 degrees with the other end at 35 degrees.

“The worm lives at iced water to hot tea in the length of its body, which is about an inch,” Palumbi said. “If we are all concerned about the oceans for the next 50 years, we need to think about the extremes.”

Palumbi said as the water changes, life in it has four options. It can move, acclimate, adapt or die. Scientists are conducting studies with the idea of seeing if something can be done to avoid the fourth option.

“The ocean is a lot warmer than it has been, and that’s affecting organisms in a pretty strong way,” Palumbi said. “But if the worm living at 176 degrees can adapt to it, what are the chances other species can adapt?”

He said some fish species have already started moving in response to changing temperatures. He said as water temperatures rise, many fish that live in cold water are moving north to maintain the water temperature they prefer. Canary rockfish, which are currently spread throughout the west coast, are expected to move all the way to the Aleutian Islands by 2080.

“Evolution is pretty common and pretty visible in ocean situations,” Palumbi said.

As an example, he pointed to pink salmon in Alaska. For years, nets captured the biggest salmon while allowing smaller fish to escape. In response, the salmon began to mature at a smaller size, allowing more and more to survive.

Outside of the water, bighorn sheep also evolved as hunters were only shooting the animals with the largest horns. The result is mature males started growing smaller horns, which led to longer lives and more time to breed.

Palumbi said he and others have spent a lot of time studying coral bleaching, which many believe is a direct result of rising temperatures. He said some areas of coral appear to be completely dead due to bleaching.

“When you look closer, you may see one piece of coral that’s bleached and one right next to it that’s not,” he said.

Palumbi said the difference could be a sign that coral is evolving rapidly to survive the changing ocean. Studies on the coral in Palau show some are heat tolerant.

“Heat-resistant colonies are pretty widespread,” Palumbi said. “They’re pretty common.”

The question for scientists is was the heat resistance due to adaptation or was it genetic? If it was genetic, via evolution, it could be a sign that coral could survive. Studies showed coral from heat-tolerant parents were also heat-tolerant, showing it is likely genetic.

“Coral can continue to evolve if climate change is not too severe,” Palumbi said. “This model shows coral can continue to evolve and keep up.”

Along with rising temperatures, acidification of the ocean is a growing concern. As CO₂ levels rise, the ocean absorbs most of it, which turns into carbonic acid. To see how the ocean is adapting, Palumbi and others studies sea urchins under different conditions.

“You basically could see evolution happening in these experiments,” Palumbi said. “The sea urchins have the ability to adapt to future CO₂ events.”

With sea creatures showing the ability to evolve quickly, what role does science play in protecting the ocean?

“Can we help?” Palumbi asked. “Can we move heat-resistant corals or kelp or sea urchins to other areas? Show we do that?”

That’s the question scientists have not reached a consensus about. While that discussion continues, Palumbi said the challenge is one that must be faced on multiple fronts.

“Financial, economic and political arms of society must grapple with climate change to solve it over the next 50 years so that the oceans begin to recover in the next 100 years,” he said. “My job is to find the conditions, find the mechanisms so we can keep everything alive over the next decades.”