NEWSELA

Man-made marine ecosystem may pose threat

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Sea Education Association's brigantine Robert C. Seamans sails 10 miles offshore from Point Loma in San Diego to conduct research into a new ecosystem known as the plastisphere, which refers to the effect discarded plastic is having on the oceans, on Sept. 14, 2013. Photo: Bob Chamberlin/Los Angeles Times/MCT

OFF THE COAST OF SAN DIEGO — Marine science student Elizabeth Lopez moved the huge steel claw slowly. Carefully, she lowered it over the side of a 134-foot sailboat. Her plan was to catch pieces of what scientists are calling the plastisphere.

The plastisphere is something scientists are only now beginning to understand. It is a sort of human-created marine ecosystem.

It starts with bits of broken-down plastic no bigger than grains of salt. Bacteria grow on those tiny pieces of debris, or trash. Then single-celled animals feed on the bacteria. Next, larger predators feed on them.

“We’ve created a new man-made ecosystem of plastic debris,” said Lopez.

Microscopic Colonizers At Sea

The plastisphere has been growing for 60 years. It’s a product of all the plastic stuff people throw out. That trash gets swept from city sewer systems and river channels into the sea. It's made up of bits of everything from flip-flops and margarine tubs to toys and toothbrushes.

When the debris washes into the ocean, it breaks down into bits. These bits are then colonized by microscopic organisms. Researchers suspect that some of these tiny creatures may be disease-causing bacteria. They are hitching long-distance rides on all the floating junk.

Scientists also fear that creatures in the plastisphere are completely breaking down chunks of plastic. That would allow dangerous chemicals to spread throughout the ocean.

“This is an issue of great concern,” said scientist Tracy Mincer. Microbes are greatly speeding up the breaking down of "plastic debris into finer bits." Scientists aren't sure "how zooplankton and other small creatures are responding."

And, she said, we don't know what's happening as plastic is being broken down. Harmful chemicals may be spreading throughout the ocean.

Every year about 245 million tons of plastic is produced. In the ocean, plastic waste gathers in vast oval-shaped “garbage patches.” Once trapped, the bits of plastic may remain for centuries.

The effects of plastic we can see are well-documented. Fish, birds, turtles and marine mammals that swallow it suffer clogged intestines. They can choke or starve to death.

Great Pacific Garbage Patch

But the effects of the tiny pieces that make up the plastisphere are only beginning to be understood.

Scientists are studying the bits of plastic found in seawater and marine life. They are learning much more about the damage plastic is causing.

“We’re changing the basic rhythms of life in the world’s oceans,” said marine biologist Miriam Goldstein. "We need to understand" what's happening.

Goldstein has studied plastic debris in the Great Pacific Garbage Patch. This huge area lies between Hawaii and California.

In October, Goldstein and oceanographer Deb Goodwin released a report on barnacles living there. One-third of them had plastic bits in their guts.

But that is only a small part of the problem. Crabs prey on barnacles. And crabs in turn are eaten by other animals. This means that the plastic that barnacles eat may be spreading through the food web.

Damaging The Oceans

Fish that swallow plastic debris build up hazardous substances in their bodies. This can cause damage to their livers. And not only the plastic itself is dangerous. So too are the poisonous chemicals the plastic has absorbed.

Other scientists have studied the microbes that live on plastic marine debris.

Most worrying so far is the discovery of bacteria that cause cholera and other illnesses. Such bacteria could be traveling long distances.

But it doesn't end with those bacteria. Other bacteria feed on their waste products. And predators feed on all of them.

“Each one of these plastic bits is a circle of life," Mincer said. "One microbe’s waste is another microbe’s dinner.”

And some microbes may simply be "waiting to be eaten by fish." This would allow them to travel into a whole new environment.

Marine scientist Drew Talley is very concerned. “It would be a crime," he said, "not to investigate the damage" plastic might be doing "to the oceans and to humans.”

Quiz

1 What is the effect of barnacles being eaten by crabs?

(A) Plastic enters the food web.

(B) Crabs start having liver damage.

(C) Harmful bacteria enter the food web.

(D) Plastic starts absorbing chemicals from crabs' bodies.

2 What happens when the plastic is broken down into small pieces?

(A) Bacteria grow on it.

(B) Small creatures eat the pieces.

(C) Toxins are released into the ocean.

(D) It gathers in vast oval-shaped "garbage patches."

3 Select the paragraph from "Great Pacific Garbage Patch" that shows how plastic is entering the food web.

4 What has been the most worrying discovery so far?

(A) barnacles had plastic in their guts

(B) fish have liver damage because of plastic

(C) presence of bacteria that cause cholera and other illnesses

(D) birds have been starving and suffocating because of plastic debris

Answer Key

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Paragraph 16:
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