Uncovering secrets of the oceans' "engines"

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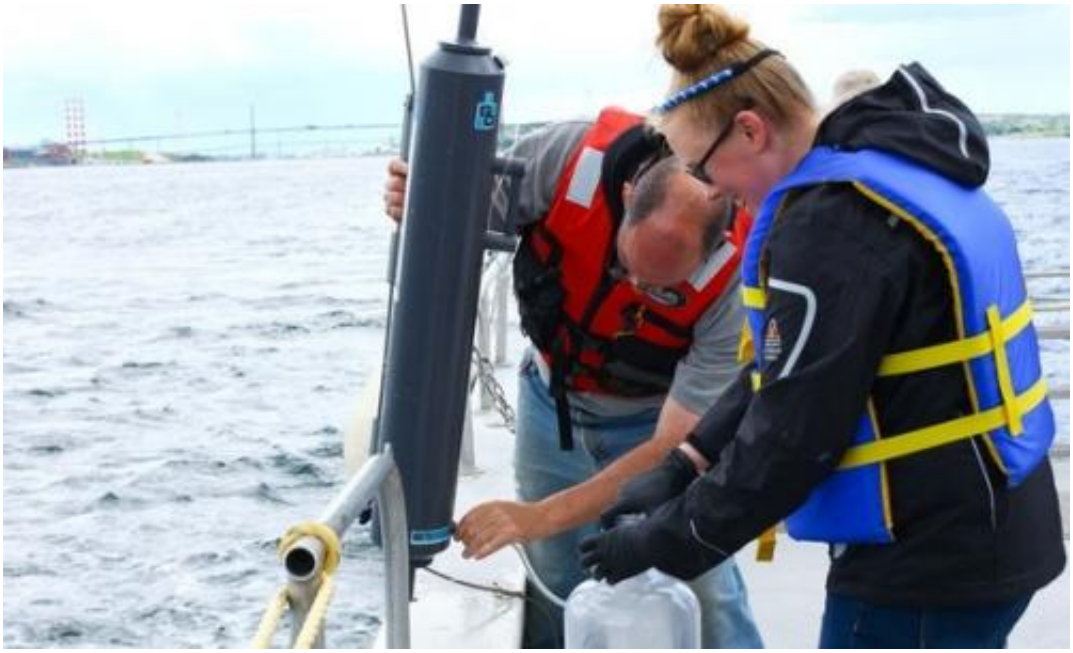

Gathering samples from the Bedford Basin. Credit: Bruce Bottomley

They're small, but boy are they mighty. The microbes (or microorganisms) living in our oceans are actually too small to see with the naked eye, but they pack a punch when it comes to their portfolio. Not only do they create oxygen for the whole world—above and below the ocean—they're also the basis of the marine life food chain.

Mystery surrounds this microscopic life, which makes up 98 per cent of the ocean's biomass. There are millions of different types of microbes in one drop of seawater and each type has its own way of making a living.

Microbes are very efficient at recycling: they eat each other, take waste products from one type of microbe and turn it into food or energy for themselves. Because they're so resourceful, nothing goes to waste.

With global warming and greenhouse gases, microbes are absorbing more carbon dioxide from the atmosphere, leading to increases in ocean acidity levels. This keeps harmful CO2 out of our atmosphere, slowing the effects of climate change for now, but maybe not forever. As well, this increased stress on the microbes could shift the balance in their ability to recycle, causing problems in terms of producing food for fish and storage of CO2. Can the microbes adapt to this kind of change? Sure, and often quickly, but it could hinder their ability to play their current role—one the vast majority of life on earth depends on.

"They're resilient, but we might not be," says Julie LaRoche, Biology professor and Canada Research Chair in marine microbial genomics and biogeochemistry. "Microbes will be around much longer than us."

There's a lot left to discover about these tiny "engines" running the oceans, says Dr. LaRoche. "The microbes are still in balance right now. When they're not, that's when we have problems."

A global initiative

That's why Dr. LaRoche and a team of students and researchers participated in Ocean Sampling Day last week. Ocean Sampling Day was a worldwide scientific effort to better understand the microbes in our oceans.

Scientists at over 160 sites across the globe set sail to collect water samples that will all be analyzed at Jacobs University in Germany. The whole point is to create a snapshot of the DNA within those samples that will paint a picture of our global ocean at a microscopic level. The

results will be shared in an open access database, so scientists everywhere can put it to use in their research.

Dr. LaRoche led Dalhousie's team, which included her lab staff Jennifer Tolman and Ian Luddington, collaborator Richard Davis of CERC.ocean, graduate student Jackie Zorz and future science students Isaac Cain and Amanda Saword. Media also tagged along to document the first ever global water sampling initiative.

Samples were taken in Halifax's Bedford Basin at 1, 10 and 15 metres deep. Davis eagerly showed all the guests on the boat how to close the sampling bottle with the use of a counter weight, while Drs. Tolman and LaRoche showed the team of students how to filter the samples, preserve them on ice and log all the appropriate data.

One of the key things the crew learned that day, however, was the importance of basic science in the observation of marine microbial life.

"Without basic science," explains Dr. LaRoche, "we have no foundation for exploring and developing solutions."

Provided by Dalhousie University