

Deep In Gulf Water, Bacteria Are Eating Spilled Oil

by Christopher Joyce

August 25, 2010

Listen to the Story

Morning Edition, NPR

There are some encouraging signs from the Gulf of Mexico that bacteria are consuming the underwater oil plume from the broken BP well. The news comes just days after oceanographer Christopher Reddy and a team from the Woods Hole Oceanographic Institution said they had found a big underwater oil plume in May and June, but no signs of oil-eating bacteria.

At the time, Reddy said microbes are about as predictable as teenagers. "Microbes are pretty selective in how they eat oil," he explained. "Sometimes they kick in; sometimes they don't. Sometimes they do the easiest work and they don't do the hard work."

The thing that I'm learning from this project is that there are no shortage of surprises from the microbial point of view.

- Benjamin Van Mooy, scientist, Woods Hole Oceanographic Institution

The hard work is what scientists had been hoping to see — bacteria consuming the more toxic chemicals in the oil plume and rendering them harmless. Reddy said sooner or later, the bugs should show up.

And now, apparently, they have.

"There's this unique cold-loving bacteria," says Terry Hazen, a microbiologist with the Lawrence Berkeley National Laboratory in California. "They actually grow better at 5 degrees than they do at room temperature."

Hazen and a large team of scientists found these new, coldwater bacteria in the oil plume, 3,000 feet deep, and in the same plume the WHOI team was following. There are several kinds of microbes, in fact — and they're eating the oil.

"Oil is the only carbon source down there deep, so they immediately take advantage of that," says Hazen. "And of course they undoubtedly have been adapted to that over millions of years."

That's because oil has been in the water for millions of years, bubbling up from the seabed. "The Gulf has natural seeps that have been putting the equivalent of an Exxon Valdez spill into the Gulf every year," he says.

Every Spill Is Unique

So why hadn't other scientists seen the bacteria? One possibility is that they were looking for low oxygen levels in the water and didn't see that. Low oxygen is the principal sign that lots of bacteria are eating oil.

But Hazen says in this case, ocean currents and the use of dispersants has spread the oil out into a thin veil of tiny droplets. So the bacteria are spread out too, and you don't find concentrated areas with low oxygen levels.

The reason Hazen's team found the bacteria is that they looked for genes and enzymes that the microbes express when they eat oil.

"The thing that I'm learning from this project is that there are no shortage of surprises from the microbial point of view," says Benjamin Van Mooy, a scientist with the WHOI team.

Van Mooy says every oil spill is unique "because the oil has a unique composition and it's also being released into an environment with its own unique chemical and physical factors at play. And there's also the microbial community."

Scientists working on the Gulf spill say that's why it's hard to predict how the remaining oil in the Gulf will behave. Unlike the Exxon Valdez spill, the BP oil was released at the seafloor, under great pressure. Dispersants spread it out into cold water, but as it rose, it reached much warmer water.

Hazen says it appears that the combination of bacteria and ocean mixing could degrade and disperse the remaining oil in a matter of weeks. "It does fit with what we've seen," he says. "So in the last three weeks, the plume at depth is completely undetectable."

But "gone" doesn't necessarily mean the Gulf is free of BP's oil. Van Mooy points out that oil has scores of chemical constituents. Bacteria consume the "low hanging fruit" first, but the harder stuff takes longer to digest. And scientists who track oil say the plume may thin out in one place and then pop up in another.

The research, published in the journal *Science*, was funded by the federal Energy Department, along with support from BP through a university consortium.