



Science Matters by David Suzuki

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Understanding diversity the first step in protecting it

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A massive deep-sea expedition in the North Atlantic recently uncovered hundreds of species of fish and squid, including several that appear to be new to science. The expedition made headlines, but some readers may have been left wondering, "So what?"

The two-month international expedition netted some 80,000 specimens from waters up to several kilometers deep. Scientists were thrilled with their discoveries, which included several potentially new species, along with a variety of strange phenomena, from reef-building cold-water coral, to planktonic organisms arranged in rings more than 10 kilometres wide.

Like a comparable study in the Pacific Ocean, it's all part of the 10-year Census of Marine Life. But at the cost of more than \$1 billion, some might say the price seems a bit high to just find a few new fish. So what makes this kind of work so important?

Well, beyond the simple thrill of gaining knowledge for its own sake, understanding life diversity on the planet and how it interacts is vital to humanity. After all, how can we claim to "manage" wild organisms if we don't even know what they are? In nature, diversity rules. A diversity of life has proven to be a key element of evolution and the survival of life on Earth. The more we understand about diversity in nature, and how to protect it, the better off we will be.

Faced with a growing population of some 6.5 billion people, and an explosive rise in the demand for energy and natural resources, the planet's life diversity is under assault at all levels - from the number of species on the planet (species diversity), to the number of different populations with a species (population diversity), to the variation within populations (genetic diversity). Although most of our focus tends to be on species diversity, population and genetic diversity are also extremely important to the health of an ecosystem.

A recent study out of the University of Toronto, for example, found that genetic diversity within a plant species can have the same effect as species diversity when it comes to influencing the variety of life in an ecological community. For the study, researchers planted clusters of a species of evening primrose at field sites, some of which were a monoculture of one genetic variation, others of which contained a number of genetic variations. They found that the most diverse clusters attracted 17 per cent more species of insects, spiders and other arthropods.

Again, however, the skeptic might ask, "Great, so greater genetic diversity means more bugs. So what?"

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Well, on a large scale, this diversity of life on Earth underpins many of the ecosystems "services" we need to survive. Microorganisms in our soil, for example, help make it fertile, while microorganisms in our oceans provide us with the oxygen we need to breathe. For humans, these services are essential to our very survival, so they are priceless. Preventing the degradation of these services is therefore essential.

Of course, humans don't set out to harm ecosystem services. Instead, we do harm on an incremental scale, site by site, ecosystem by ecosystem. That makes the impacts less obvious - especially when we don't understand how species and processes interact with one another in the first place.

Fortunately, some ecosystem services take place on a scale small enough to measure with a dollar value. A recent study in Costa Rica found that preserving fragments of original forest around coffee plantations could boost crop yields and increase income. Researchers found that the forest offered a refuge for bee species, which helped pollinate coffee plants. Plants closer to the forest received more pollen more often from these bees than plants further away. As a result, plants near the forest yielded 20 per cent more beans.

So what's the big deal about finding fish in the middle of the ocean? It may not have been in the news stories, but it's all part of the big puzzle of understanding the diversity of life on Earth, how we benefit from it and how we can protect it. And that is a pretty big deal indeed.

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