Smithsonian.com

Science Is Falling Woefully Behind in Testing New Chemicals

Over 10 million new chemicals are synthesized each year, but with little funding science can't keep up

Jason Daley, Correspondent, February 3, 2017



Wikimedia Commons

Recently, a <u>PBS documentary</u> about Rachel Carson's life <u>made headlines</u>. Her seminal work <u>Silent Spring</u>—which documented the detrimental effects of pesticides—still stands as a pillar of the modern environmental movement. But a new report suggests that science has been struggling to stay afloat in a rapidly growing sea of chemicals. The study, published in the journal <u>Frontiers</u> in <u>Ecology and the Environment</u>, suggests that the research community is falling woefully behind in studying the chemicals, pesticides, pharmaceuticals and other novel concoctions seeping into our oceans, waterways, soil and food chain.

As <u>Kieran Mulvaney at Seeker</u> reports, new chemical compounds are produced at a rate

Smithsonian.com

of 10 million per year, which translates into 1,000 new ones synthesized every hour. Meanwhile, research funds have dried up, significantly dropping off since the 1990s as the problem with chemicals in the environment has grown.

"The amount and diversity of pesticides, other pharmaceuticals and industrial chemicals that humans are releasing into the environment are increasing at rates that match or exceed recent increases in CO2 emissions, nutrient pollution from nitrogen fertilizers and other drivers of global change," Emily Bernhardt, biogeochemist at Duke University and lead author of the article says in a press release. "But our analysis shows we're not spending anywhere near the amount of attention or money that we should be to assess their impacts."

"The lack of knowledge about how synthetic chemicals alter ecological processes represents a critical blind spot in the rapidly developing field of global ecology," the researchers write in the paper.

Bernhardt and her colleagues looked at trends in funding for research into environmental chemicals and publishing According trends. to Lindsey Konkel at Science, the investigators found less than one percent of the papers published in the top ecological journals in the last guarter century dealt with synthetic chemicals. The paper also points out that at the 2015 meeting of the Ecological Society of largest America, the gathering of ecologists ever, only 51 international presentations involved chemical contamination, only about 1.3 percent of papers presented.

Even more concerning is the funding situation. "During the 1990s and early years of this century, the primary EPA source of funding for research on chemicals in our environment was the Science to Achieve Results – or STAR – program," Richard Di Giulio, Sally Kleberg Professor of Environmental Toxicology at Duke, says in the release. "STAR's funding peaked in 2001 at 1.3 percent of the EPA's budget and is now at about 0.5 percent of the budget." Instead, much of that funding has gone towards studies of climate change and human health.

Bernhardt tells Mulvaney that the difficulty of studying chemicals in the environment might also dissuade researchers. "It's really technically challenging work. A lot of questions are difficult to answer because most of the places where you really worry about chemical contamination have lots of different kinds of chemicals, and chemical identification and measurement is really hard," she says.

In an opinion piece recently published in the Environmental iournal Science & Universitv Technology, of Michigan researcher G. Allen Burton and colleagues also address the issue, writing, "The United States Toxic Substances Control Act is illequipped to properly evaluate whether significant environmental concerns are associated with this flood of chemicals into our marketplace. As a consequence, chemicals continue to be approved for commercial use, although their environmental impacts are unknown."

The Toxic Substance Control Act did <u>undergo an overhaul last summer</u>. Passed in 1976, the law was designed to help regulators assess the safety of chemicals. The new statute authorizes the EPA to use more modern testing procedures and helps increase transparency among chemical manufacturers. But Burton argues that declining funding for such research short circuits any improvements the act makes.

Even so, reports of concerning effects of chemicals keep rolling in. A study was

Smithsonian.com

published just this week that suggests that PFASs, chemicals used for their stainresistant and nonstick properties, are found in one third of fast food containers, reports <u>Lisa Rapaport at *Reuters*</u>. Though this seems benign, several <u>studies have</u> <u>shown</u> that these compounds "increased risk of certain cancers, hormone problems, high cholesterol, obesity and immune suppression in human and animal studies," Rapaport writes.

Chemicals can have big impacts on ecosystems as well. For instance, the percentage of intersex fish, those with both male and female sex organs, has been on the rise in many areas in North America. A recent study on Ontario's Grand River showed that filtering out chemical contaminants at a wastewater treatment facility reduced occurrences of intersex fish from close to 100 percent in some areas of the river to less than ten percent in three years. And that's just the tip of a very large iceberg of effects chemicals are having on living organisms.

"In the 1960s, Rachel Carson's Silent Spring sounded the alarm on the environmental dangers of synthetic chemicals," Emma J. Rosi, a freshwater ecologist at the Cary Institute and one Bernhardt's co-authors says in a press release. "The problem hasn't gone away, it's only intensified, and we need to reawaken awareness."

Jason Daley is a Madison, Wisconsin-based writer specializing in natural history, science, travel, and the environment. His work has appeared in *Discover*, *Popular Science*, *Outside*, *Men's Journal*, and other magazines.