salon.com

http://www.salon.com/2007/06/29/rachel_carson/

FRIDAY, JUN 29, 2007 12:00 PM UTC

Rachel Carson's birthday bashing

The right has revved up its claim that the environmental pioneer who criticized DDT was responsible for the spread of malaria that killed millions. The facts say otherwise.

BY KIRSTEN WEIR

Rachel Carson has been shouldering a lot of blows lately, especially for a woman who has been dead more than 40 years. Last month marked the 100th birthday of the woman whose 1962 book, "Silent Spring," is credited with launching the modern environmental movement. While environmentalists paused to celebrate Carson's legacy, those politically opposed to environmental regulation took the opportunity to engage in some birthday-bashing. They blame Carson and her successors for millions of deaths by malaria — deaths, they say, that could have been prevented if she hadn't scared the world away from the potent pesticide DDT.

Foremost among the finger-pointers is Republican Sen. Tom Coburn of Oklahoma, who blocked bills to honor Carson and name a Pennsylvania post office for her. Coburn's Web site links visitors to Rachel Was Wrong, a site hosted by the Competitive Enterprise Institute (a free-market think tank known for, among other things, disputing evidence that human activity is driving climate change). Beside a grim photo gallery of malaria victims, the site claims "millions of people around the world suffer the painful and often deadly effects of malaria because one person sounded a false alarm. That person is Rachel Carson."

Novelist Michael Crichton has a front seat on the bandwagon. He took on DDT and climate change in his footnote-studded 2004 novel, "State of Fear." "Banning DDT killed more people than Hitler," his protagonist alleges. "And the environmental movement pushed hard for it."

The Coburn/Crichton talking points have infected the mainstream press. In his New York Times Science column this month, John Tierney thrashed Carson's warnings about insecticides and argued that her voice still "drowns out real science." Over at the Pittsburgh Tribune-Review, Bill Steigerwald blamed "environmentalists spooked by Rachel Carson" for banning a "miracle weapon" that is "like Kryptonite to the mosquitoes."

Malaria's burden is enormous. Each year, the disease infects 350 to 500 million people and kills at least a million — the vast majority in Africa, mostly children under 5. As decades have passed, science has shown that Carson was wrong about some of the dangers she associated with DDT. It's also true that the insecticide can be a valuable tool in the arsenal against malaria. But blaming Carson and the environmental movement for malaria's death toll is not

supported by evidence from generations of scientists and malaria researchers.

"Groups are latching onto the emotional impact of the malaria story, which is truly a human tragedy, to discredit environmentalists," says John M. Balbus, chief health scientist with Environmental Defense. "Are there places where DDT may have been beneficial? Probably, yes." But is the 1970s DDT ban "the cause for rampant malaria and millions of deaths? Absolutely not."

Historians and scientists have shown that despite some benefits of DDT, few African countries made the pesticide a part of their malaria control efforts over the past quarter century. Many factors led to the decreased use of DDT — factors that had nothing to do with Carson. In fact, the decline in DDT use coincided with a drop in malaria rates.

Socrates Litsios, a historian and former scientist for the World Health Organization (the agency that has headed global malaria control efforts since the 1960s), says the assertion that "Silent Spring" and the DDT ban led to millions of deaths is "outrageous." May Berenbaum, head of the Department of Entomology at the University of Illinois at Urbana-Champaign, who has studied mosquitoes and malaria, says that "to blame environmentalists who oppose DDT for more deaths than Hitler is worse than irresponsible."

- - - - - - - - - - - - - - - - -

DDT was first created, for no practical purpose, in 1874 as a science project of a German chemistry student. It earned little attention until 1939, when Swiss scientist Paul Hermann Muller discovered that the chemical was deadly to insects. During World War II, Allied soldiers were dusted with DDT to rid them of the lice that spread typhus. Around the same time, governments in Europe and elsewhere began using the compound to control the mosquitoes that carried malaria. DDT was so successful at killing disease-carrying insects that Muller was awarded the 1948 Nobel Prize in medicine.

In 1955, an anti-malaria crusader named Fred Soper launched the Global Malaria Eradication Program with backing from the World Health Organization. He'd successfully battled malarial mosquitoes in countries such as Brazil years earlier, before DDT was available. Now, DDT was his weapon of choice. Sprayed on the inside walls of homes, it repelled many mosquitoes and killed those that lingered too long. With Soper's help, malaria rates plummeted in countries around the world, including Taiwan, India, Australia and large parts of the Caribbean.

Advocates of DDT often argue that the chemical was instrumental in eliminating malaria from the United States as well. "The U.S. and western European countries all used DDT in the mid 20th century to eliminate malaria from their territories," Coburn has said, "but then banned the substance for use by poor countries today to combat their number one health threat."

In fact, malaria "was pretty well gone" from the United States before DDT appeared on the scene in the 1940s, says Jay Ellenberger, associate director of field and external affairs for the U.S. Environmental Protection Agency. Improvements in sanitation and a higher standard of living played a big role, as did public health measures such as installing window screens and draining the swamps where mosquitoes bred. Insecticides, including DDT, did help deal the disease a final blow, and by 1952 malaria had been eradicated from the country.

Meanwhile, DDT continued to be used widely to control agricultural pests in the United States. Mass quantities were dumped from airplanes onto crops, and more was sprayed in forests to exterminate the beetles that spread Dutch elm disease. The indiscriminate use of the chemical caught the eye of Carson, a former marine biologist who worked as a publications editor at the U.S. Fish and Wildlife Service.

Carson wasn't the first to sound the alarm about DDT. In the 1950s, various lawsuits, brought by ornithologists, beekeepers and concerned citizens, sought court injunctions to end DDT spraying. But Carson's passionate and poetic treatise, "Silent Spring," captured the public's attention. Carson warned that man-made chemicals spelled nearly certain doom for the environment and human health, and that DDT was among the chief villains. "The most alarming of all man's assaults upon the environment is the contamination of air, earth, rivers, and sea with dangerous and even lethal materials," she wrote. In a chapter titled "Elixirs of Death," she described DDT in no uncertain terms. "Dissolved in oil, as it normally is, DDT is definitely toxic," she wrote.

The author filled most of her pages by describing the harm that chemicals such as DDT can inflict on wildlife and human health. She only briefly mentioned DDT's role in fighting diseases transmitted by insect vectors. Yet she allowed that insecticides could play a role in the fight against disease. "No responsible person contends that insect-borne disease should be ignored," she wrote. "It is not my contention that chemical insecticides must never be used. I contend ... that we have allowed these chemicals to be used with little or no advance investigation of their effect on soil, water, wildlife, and man himself."

Mark H. Lytle, a professor of history at Bard College and author of "The Gentle Subversive," a biography of Carson, explains that context is key to understanding why "Silent Spring" had the power it did. In 1959, mild panic had ensued when the U.S. government announced, just days before Thanksgiving, that cranberries were contaminated with a weed-killing chemical. Over the next few years, the public witnessed the disaster of thalidomide (a drug prescribed to treat morning sickness that resulted in thousands of babies born with birth defects) and a scare over the radioactive element strontium 90 (which was found to have accumulated in people's bones in the years following nuclear testing). "When Carson wrote, there had been a whole series of environmental events that were scary," Lytle says. "It made her all the more credible."

In 1972, the EPA banned DDT in America. Carson's solid reputation may have contributed to the decision, Lytle says. But Carson was by no means the sole reason for the ban. According to the EPA's Ellenberger, the decision was backed by sound science, with evidence of DDT's negative effects on wildlife continuing to mount. At the same time, after years of dumping DDT on agricultural pests, insects were becoming increasingly resistant to the chemical. "The risks were increasing, and the benefits were declining," Ellenberger says. "If risks exceed benefits, EPA is supposed to take action."

Overseas, DDT was being phased out of the fight against malaria, but Carson and budding environmentalists were not the reason. In the 1950s, when the Global Malaria Eradication Program was launched, the U.S. had been a major financier of it. But as the years ticked by, eradication remained a distant dream, says Litsios, the retired World Health Organization scientist. (His book, "The Tomorrow of Malaria," was published in 1996.) He explains that the global program "oversold the possibility of eradication" and Congress tired of its promises. By the early '60s, the money Congress had pledged to the program dried up. In 1969, the WHO officially abandoned the eradication effort.

During that period, the fight against malaria in Africa never picked up steam. Robert Snow, head of the malaria group at the Wellcome Trust/Kenya Medical Research Institute in Nairobi, has done considerable research and number crunching in an attempt to quantify the true burden of malaria in Africa over the last century. In an article published in 2001, in Trends in Parasitology, he wrote, "Despite the successes of the WHO eradication campaign in many parts of the world following the Second World War, most of Africa was regarded as a lost cause, and in practice the eradication of malaria in Africa was never attempted."

In the 1960s and 1970s, colonialism in Africa was ending and several countries were undergoing major changes. "Many African countries realized they couldn't really expect to progress with malaria at all if they didn't have some

kind of infrastructure," says Litsios. The WHO couldn't afford to launch a massive insecticide-spraying program and help countries build up basic health services at the same time. It chose the latter, Litsios says.

Better public health services helped improve childhood mortality in Africa, but malaria programs faltered. Malaria is a complex disease caused by a parasite with a complicated life cycle. "For malaria control, you need to have a really good understanding of mosquitoes, the malaria parasite and human behavior," says Richard Tren, chairman of the board of Africa Fighting Malaria, an advocacy group that has lobbied for increased use of DDT. In the '70s, many health programs were ill-equipped to handle that complexity.

Tren, who is allied with libertarian and free-market think tanks, such as the Institute of Economic Affairs, believes that anti-insecticide sentiment scared donors away from DDT programs. "By the late 1960s and early 1970s, the donor nations were starting to withdraw support from insecticide-spraying programs and from the use of DDT," Tren says. "I am confident in saying that the anti-DDT crusades harmed malaria control and cost lives."

That is misleading, say Litsios and Clive Shiff, a malaria researcher at the Johns Hopkins Bloomberg School of Public Health who has participated in malaria programs in Africa for decades. They stress that aid organizations weren't anti-DDT during that period, they were pro-medicine. Through the '70s and '80s, most countries, on the advice of the WHO, "changed their approach to malaria control from insecticide treatment to treating people with chloroquine" — which kills the parasites that cause malaria — "because that was a way they could impact the mortality of the disease," Shiff says. "I don't think the ban of DDT in the U.S. had any impact on malaria control programs in Africa, certainly not in southern Africa where I was working."

According to Snow's research, malaria was responsible for 18 percent of deaths in Africa before 1960 and 12 percent of deaths between 1960 and 1989. In other words, deaths from malaria decreased during the period that treatment shifted from insecticides to medicine.

Still, DDT can be a boon to malaria control. The chemical is sprayed onto the inside walls of houses, where it has little chance of accumulating in the environment. What makes it bad for wildlife makes it good for mosquito control: It's extremely persistent. DDT crystallizes onto the walls and stays there for a year or more, repelling some mosquitoes and killing others. Of the 30-40 species of Anopheles mosquitoes that carry malaria, most bite after dusk, so protecting people in their homes can have a big impact.

South Africa — one of the few African countries that could afford a spraying program without help from aid organizations — continued to use DDT after it was banned in the United States. By 1996, South Africa reported fewer than 10,000 malaria deaths annually. That year, it switched from DDT to another insecticide. The new chemical was also sprayed to control agricultural pests, and mosquitoes quickly developed resistance to the widely used chemical. By 2000, the number of annual malaria deaths had spiked to more than 60,000.

Elsewhere in Africa during the 1990s, the focus shifted to insecticide-treated bed nets that protect sleeping children from malarial mosquitoes. The nets have good success rates when used correctly, but even with their help, malaria was still winning the war. From 1990 to 1995, deaths caused by malaria soared to 30 percent. But the jump had nothing to do with DDT or any insecticide-spraying program. Deaths increased, Snow concluded, because the malaria parasite was evolving resistance to chloroquine.

- - - - - - - - - - - - - - - -

In 2006, the WHO announced it would actively back DDT and indoor residual spraying as a tool for controlling malaria. For Tren, that was good news. "In the last 10 years, almost all of the attention has been going to bed nets,"

Tren says. "I think indoor residual spraying will have an increased role, and there will be more of a balance now."

Public health workers generally agree that balance is the best approach: spraying houses, hanging bed nets, tracking outbreaks and treating those infected with malaria. DDT has a place in that strategy, but it is not the silver bullet it's often made out to be. Today, a variety of insecticides are available for indoor residual spraying. DDT, says Shiff, "is just one important tool." And not always the best tool.

Mosquitoes can evolve resistance to any insecticide. In India, DDT-resistant mosquitoes were reported as early as 1959. "Insects will develop resistance to insecticides," says entomologist Berenbaum at the University of Illinois. "This is one sure thing you can count on."

Mosquitoes, Berenbaum says, can develop resistance in any number of ways — biologically, biochemically, even behaviorally. In some regions, mosquitoes might develop resistance by becoming physically immune to the effects of DDT. In other populations, mosquitoes might evolve new behaviors, such as avoiding inside walls and resting on the unsprayed outer walls of homes after biting their victims.

Relying on insecticide alone to control malaria ignores big pieces of the puzzle, Berenbaum says. Mosquitoes may be the carrier, but it's the Plasmodium parasite that causes malaria. "It's not just the mosquito. There's a pathogen involved, and there are people involved. To reduce this extremely complicated situation to one bad guy is beyond simplistic," she says.

That oversimplified argument seems to suit Coburn, Crichton and their cohorts in the press. In his Tribune-Review column, Steigerwald claimed that "environmentalists are still outraged" over the use of DDT. That's not so. Most prominent environmental organizations, including the Sierra Club and Environmental Defense, support indoor spraying of DDT for malaria control, at least until safer alternatives are found.

In his New York Times column, Tierney blasted Carson's "junk science." It's true that some of her claims sound foolish to modern readers, like the case she cited of a woman who sprayed DDT to kill spiders in her basement in August and September and was dead from leukemia by October. She also raised concerns that DDT could be linked to liver disease and central nervous system damage.

But many of the dangers Carson warned about, such as the detrimental effects of DDT on birds, have held up. It is now well accepted that when DDT accumulates in the environment, it causes eggshells to thin and crack, leaving predatory birds such as ospreys and other raptors especially vulnerable. DDT is also toxic to many fish. "In retrospect, the facts have borne out the concerns," says Environmental Defense's Balbus.

While DDT's detrimental environmental effects have stood up to scrutiny, repeated studies have found no evidence that DDT exposure increases the risk of cancer. That's not to say that the chemical is benign. DDT appears to have a hormonal effect on humans, and exposure to high levels is linked to a shortened period of lactation among nursing mothers. A study led by scientists at the National Institute of Environmental Health Sciences, published in the medical journal Lancet in 2001, found that heavy DDT exposure in the 1940s and 1950s was linked to an "epidemic" in the 1960s of premature births — a significant risk factor for infant mortality.

Today, to many environmentalists, Carson is still a hero for encouraging people to treat the planet with care. "She taught people how to change their mind-set," Lytle, her biographer, says. "Her major legacy was that she taught the public to think ecologically." But for better or worse, her legacy will probably always be bound up with the story of DDT. What her critics seem unwilling to admit is that Carson was just one person, and DDT is just one tool. DDT plays a part in the fight against malaria, but it's one drop in a very big puddle.

As for the DDT debate in vogue at the moment, Berenbaum says, "it's all emotional and not rational." She fully agrees that malaria is an international tragedy, and she doesn't "place the lives of ospreys above the lives of people," she says. But neither would Berenbaum pin her hopes on one insecticide — a point Carson herself understood half a century ago. "Carson's point wasn't that DDT was evil," Berenbaum says. "It was that if you put all your eggs in one basket, that basket's going to break."

Kirsten Weir

Kirsten Weir is a science writer who lives near Portland, Maine.
