

## MOSQUITOES, DISEASE, AND DDT

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Each year, 1,124,000 people die from malaria. An additional 42,280,000 people are chronically afflicted by the disease, which causes recurring chills, fevers, and anemia. The vast majority of these individuals live in developing nations, primarily in Africa. Many are too sickened to carry on vital subsistence activities. The lowly mosquito is responsible for transmitting this disease and dozens of others to humans across the world. Dengue fever infects 653,000 annually, causing fever, pain in the joints, rash, and hemorrhaging; it has no specific treatment and kills 21,000 people each year.

The most effective method of controlling these diseases is controlling the vector, that is, killing the mosquitoes before they can transfer the disease. In turn, the most effective method of killing mosquitoes is DDT. To date, no other pesticide has proven to be as effective, as nontoxic to humans, and as inexpensive to produce. DDT's toxicity to humans is so low that it is common practice to dip sleeping nets in DDT. During World War II, it was credited with saving the lives of hundreds of thousands of allied soldiers fighting in the Pacific. Immediately after the war, it became the most widely used pesticide in history—not only by public health authorities but also by U.S. farmers from coast to coast.

But if DDT was the most effective and (for humans) least toxic pesticide ever discovered, it is also the most persistent. Once applied, it remains in the environment for months or years. It bioaccumulates in fatty tissue. As it moves up the food chain, from little fish to bigger fish and then to eagles and

ospreys, for example, it becomes biomagnified. The resulting environmental dangers of DDT were famously explained by Rachel Carson in her landmark book *Silent Spring*:

For the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death. In the less than two decades of their use, the synthetic pesticides have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere. They have been recovered from most of the major river systems and even from streams of groundwater flowing unseen through the earth. Residues of these chemicals linger in soil to which they may have been applied a dozen years before. They have entered and lodged in the bodies of fish, birds, reptiles, and domestic and wild animals so universally that scientists carrying on animal experiments find it almost impossible to locate subjects free from such contamination. They have been found in fish in remote mountain lakes, in earthworms burrowing in soil, in the eggs of birds—and in man himself. For these chemicals are now stored in the bodies of the vast majority of human beings, regardless of age. They occur in the mother's milk, and probably in the tissues of the unborn child.<sup>1</sup>

*Silent Spring* has been credited with being the motivating force behind the eventual banning of DDT in the United States, and the elimination of DDT is believed by nearly all experts to be the single most important factor behind the recovery of endangered birds of prey, most notably the bald eagle.

Nevertheless, at the end of 2002, twenty-four countries severely impacted by malaria and other tropical diseases still relied on DDT as their primary weapon against the diseases responsible for much death and suffering. Now, however, there is an international movement to end the use of DDT worldwide.

## DISCUSSION

The United States experiences much less mosquito-related disease and death than many other countries. In part, this is due to the country's excellent medical system and to the surveillance activities of the Centers for Disease Control and Prevention (CDC). But in large part, it is also due simply to climate. With the exception of some areas in the southern portion of the country, malaria-bearing mosquitoes cannot survive in the United States.

The vast majority of U.S. citizens who contract malaria or other tropical diseases contract them while traveling abroad.

But the United States does face increasingly common outbreaks of other mosquito-borne diseases carried by other species of mosquitoes. Headlines in the summer of 2002 called attention to the West Nile virus, which killed 241 of the 3,852 people who were known to have contracted the disease—some as far north as New England. Eastern equine encephalitis is becoming more common and ranging across more of North America. Even dengue fever has begun to appear in some parts of Florida.

The CDC advocates aggressive mosquito control measures to combat West Nile virus. Effective mosquito control involves multiple efforts: habitat reduction (draining standing water), pesticides, and integrated pest management (IPM), which uses natural predators to suppress mosquito populations by introducing fish that prefer mosquito larvae and building bat boxes to encourage these predators. Although IPM is useful and important, it has not supplanted the use of pesticides.

## QUESTIONS

1. Should DDT be banned worldwide because of its long-range ecological damage? As long as public health authorities in some developing countries believe that they need DDT, should they be permitted to import and use it?
2. Under U.S. law, pesticides that are not permitted to be used in the United States can still be manufactured in this country and exported for use elsewhere. In fact, a large fraction of the world's DDT is now manufactured in countries, including the United States, that ban its use. Is this an example of environmental racism?
3. With pesticides, there seems to be a systematic trade-off between *environmental persistence* and *acute toxicity*. The families of chemical agents that degrade quickly, thus reducing the risk of bioaccumulation or biomagnification, are also much more toxic to humans who are exposed to them. Deaths due to accidental pesticide poisoning, for example, increased dramatically in the United States when DDT was replaced by newer, less persistent chemicals. In much of the U.S. agricultural sector, the persons most likely to be exposed to pesticides are migrant workers. Is it fair that these poorest members of society

bear the health costs associated with eliminating DDT's environmental effects?

4. DDT was once used to kill head and body lice, a rapidly growing nuisance for American schoolchildren. It is far less likely to cause neurological damage than the medicines now available in the United States. It is also far more effective. Should an exception be made to permit the use of DDT by prescription for lice? Or would this inevitably lead to cries that "if it's safe enough for our children, it's safe enough for our corn!"

## NOTE

1. Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 1962), 15-16. For a flattering but largely fair account of the origin and impact of *Silent Spring*, see Natural Resources Defense Council, "The Story of Silent Spring," available at [www.nrdc.org/health/pesticides/hcarson.asp](http://www.nrdc.org/health/pesticides/hcarson.asp).

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