

PERSPECTIVE

Pesticides in Perspective

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As people around the globe pay increasing attention to environmental issues, the controversial topic of pesticide use resurfaces again and again. Scientists and policy makers continue to pour money into researching possible ill effects of pesticides, and, as a result, many dangerous pesticides have already been banned. These days, very few pesticides even make it onto the market; one reason is that they must undergo approximately 100 health and environmental tests.

There is a trend toward equating the word “pesticide” with the word “poison.” This generalization precludes the public from realizing that pesticides provide health benefits to people in all countries around the world. Pests reduce food supplies available to people, subsequently compromising standards of living. Less available land, fewer workers of said land, higher prices for equipment and land, and a record number of mouths to feed dictate that pesticides remain part of the big picture if we are to continue to feed world populations. The hazards of using pesticides must then, of course, be weighed against the advantages.

In 1962, Rachel Carson’s *Silent Spring* broke news to an unsuspecting public when Carson delineated the dangers of pesticides such as organochlorines. This class of chemicals includes the pesticide DDT. DDT and similar pesticides are now largely banned, and rightfully so. But it was not their selective, occasional use that was the problem; it was their massive overuse. Even in *Silent Spring*, Carson pointed out the fact that DDT was used effectively to kill malaria-causing mosquitoes; this has saved thousands of human beings from suffering and death. Today, in lieu of another solution, DDT continues to be sprayed on the walls of domiciles in underdeveloped countries, and continues to chase malaria. Its use is discriminate and effective.

The dose makes the poison. To be certain, it is a problem if one dumps DDT over the

top of another person’s head, or if one sprays the inside of a building with DDT on a daily basis. But even water, forced upon a person in large doses, can be lethal. Paracelsus first stated the concept in the 16th century that “. . . all substances are poison, there are none which are not; the right dose differentiates a poison and a remedy.” Nowadays, scientists study dosage-response curves carefully to ascertain at what point negative biological responses to foreign substances occur. This concept is an important one in epidemiological studies. In undergoing these studies, we can make decisions regarding more appropriate “doses” of substances like pesticides. Perhaps Paracelsus’s statement is most useful today because, when we regard everything as a potential toxicant (including water), management of the toxicant becomes more important than finger pointing.

There are many other instances where pesticides offer benefits that the public is not entirely aware of; indeed, the public may jump on a bandwagon advocating for discontinuation simply *because* a pesticide is a pesticide. But glyphosate, for instance, can be used to fight off invasive plants such as the West Coast’s *Spartina* (cordgrass). Yes, one could easily argue that glyphosate is bad, and it appears to be somewhat harmful to aquatic life, although it is relatively harmless and non-toxic to the rest of the environment. However, glyphosate is one of the control methods responsible for containing *Spartina*’s spread, and without it, whole delicate ecosystems could be lost, migratory bird populations along with them. Discriminate use of glyphosate can result in effective control of cordgrass, and limited, targeted spraying will have little effect upon the surrounding environment. In this case, the benefits most probably outweigh the costs. Glyphosate is also the major ingredient in Roundup, which is used extensively in agriculture in order to control weeds. Many people, however, are unaware that it is used to eliminate weeds and small trees in electrical substations. These weeds and trees can compromise the grounding system lying beneath the yard rock in these stations, which could result in death to human workers at the substations. Therefore, one could argue that Roundup

actually saves lives, while posing little in the way of an environmental hazard.

Carbaryl, a pesticide more toxic to aquatic invertebrates than glyphosate, is used in certain West Coast locales to control burrowing shrimp, which destroy oyster populations. Not only do burrowing shrimp end up hurting oyster growers economically, but both the Pacific oyster (*Crassostrea gigas*) and the Olympia oyster (*Ostrea lurida*) are listed by Washington State as “priority species” vulnerable to significant declines; in addition, the Olympia oyster is being considered for listing as endangered, threatened, or sensitive by Washington State. Thus, the careful use of carbaryl against burrowing shrimp may actually aid in the preservation of biodiversity.

West Nile Virus can cause encephalitis, an inflammation of the brain that may result in death. Meanwhile, in places like New York, actions to control West Nile Virus involve the use of pesticides such as Sumithrin, Resmethrin, and Malathion. Each of these pesticides is considered only slightly to mildly toxic to humans when used correctly. Again, limited and targeted use could potentially save lives. Rather than eliminating these pesticides, a better goal may be working to ensure that they are administered safely.

People in New Orleans face the loss of entire homes and businesses by the Formosan termite. This pest can be controlled by hexaflumuron, an effective pesticide that poses a risk to only one aquatic species—a species that is unlikely to be exposed to hexaflumuron in the first place. A ban on hexaflumuron and other pesticides used in the control of termites would result in significant property losses for potentially millions of people. Instead, a smart use of energy should involve studying which pesticides used in termite control will wreak the least havoc on the environment.

Gypsy moths can defoliate up to 13 million acres of trees in a year (this did happen in 1981). *Bacillus thuringiensis* (*Bt*) is a relatively harmless (according to many) microbial and biological pesticide that is effective in controlling the gypsy moth. *Bt* and other new methods of control have replaced

agents such as DDT, which proved to be harmful to the environment. The use of *Bt* is a good example of substituting dangerous pesticides with far less harmful ones rather than focusing energy on eliminating the pesticides altogether.

You get the picture. A common-sense perspective on pesticides does not advocate for their elimination, but for eliminating pesticides that clearly pose significant health problems to humans and other organisms. Labeling for correct use and dose is an important piece of this picture, although unfortunately this may largely be ignored, especially in developing countries where the use of pesticides (such as dangerous chlori-

nated compounds) is increasing. Efforts should focus on the effective and safe use of pesticides. Education is crucial; as Joseph Rodricks states, ". . . the public debate on these issues will not improve much until the population is better educated on the fundamental issues."

References

- Bosso, C. J. 1987. *Pesticides and Politics: The Life Cycle of a Public Issue*. University of Pittsburgh Press, Pittsburgh, PA, 294 pp.
- Carson, R. 1962. *Silent Spring*. Houghton Mifflin, Boston, MA, 304 pp.
- Colburn, T., D. Dumanoski, and J. P. Myers. 1997. *Our Stolen Future*. Penguin Books USA, New York, 316 pp.

Rodricks, J. V. 1992. *Calculated Risks: The Toxicity and Human Health Risks of Chemicals in Our Environment*. Cambridge University Press, Cambridge, UK, 256 pp.

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