

Pesticide Resistance: Is There a Potential Public Health Disaster?

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In our society, we often take pesticides for granted. They keep our cities free from rodent infestation, prevent illness and disease, decrease the damage inflicted by termites and lice, and allow farmers to produce large, blemish-free harvests and raise good-quality animals. Even organic farmers rely on pesticides to make their crops appealing. “Contrary to popular belief... pesticides are in fact used on organic foods. Pesticides are essential for farming quality products that consumers will buy! The pesticides used by organic farmers are considered natural biopesticides [according to the EPA, “types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals”]” (Eco World). However, when pesticides become ineffective, problems occur.

The Insecticide Resistance Action Committee defines resistance as, “A heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species’.” Pesticide

resistance develops when pests who have survived exposure to a pesticide reproduce. Their offspring are born with an increased tolerance to the pesticide, and the cycle continues, the resistance increasing with every generation. Since pests can multiply rapidly, it is obvious how resistance is able to spread quickly in a short amount of time. “Pesticide resistance is increasing. In the 1940s, U.S. farmers lost 7% of their crops to pests. Since the 1980s, loss has increased to 13%, even though more pesticides are being used” (Pesticide Action Network). However, does pesticide resistance have the potential to cause a public health disaster? I would like to explore this idea by discussing the effects pesticide resistance has on human exposure to pesticides and the transmission of pest-borne diseases.

As pesticide resistance increases, humans will be exposed to larger doses of pesticides. When crop-devouring pests develop a resistance to the pesticides used on crops, farmers often have to spray more insecticides to achieve the same results. The EPA acknowledges that high doses of pesticide exposure can disrupt the human endocrine system, create birth defects, inflict nerve damage, and cause cancer. Pesticide-contaminated groundwater is also harmful to the human body. In fact, a recent study published in the journal, *Environmental Health Perspectives* discovered that “[R]ural residents who drank private well water within 500 meters of fields sprayed with certain pesticides had an increased - up to 90 percent - risk of developing [Parkinson’s Disease]” (Beyond Pesticides). These problems will increase as farmers use higher doses of pesticides on their crops to combat resistant insects. “Farmers get caught on

the treadmill as they are forced to use more and more — and increasingly toxic — chemicals to control insects and weeds that develop resistance to pesticides” (Pesticide Action Network). This will not only affect the farmers and workers who spray these pesticides, but will also expose neighbors, nearby animals, and local water-sources to higher doses of toxic pesticides, potentially creating a public health disaster.

Pesticide resistance also has the capacity to increase the outbreak of pest-borne illnesses. DDT and DEET mosquito repellants have been used for years to combat deadly mosquito-borne diseases such as malaria, dengue fever, and yellow fever. Although many Americans think of DDT in a negative light, researchers from the Uniformed Services University of the Health Sciences in Bethesda, Maryland stated, “The historical record of malaria control operations show that DDT is the most cost-effective chemical for malaria control” (Thompson Reuters). Sri Lanka is an example of the effectiveness of DDT. With around 1 million malaria cases annually, Sri Lanka began spraying DDT in 1948. The number of annual cases dropped to 18 in 1963 (McNeil). According to the World Health Organization, “Vector control is the main way to reduce malaria transmission at the community level. It is the only intervention that can reduce malaria transmission from very high levels to close to zero” (World Health Organization). Unfortunately, pesticide resistance is bringing attempts at vector control to a screeching halt. Furthermore, in areas where DDT has been used freely—indeed, where it is needed most to combat mosquito-borne diseases—mosquitos have been developing resistance

to this insecticide. “[Countries in sub-Saharan Africa and India] are characterized by high levels of malaria transmission and widespread reports of insecticide resistance” (World Health Organization). With mosquito resistance to DEET and DDT on the rise, you can image the potential results. Mosquito-borne diseases are already out of hand, even with highly-effective insecticides. However, mosquitos are not the only disease-carrying pests. Rats can develop resistance to rodenticide, leading to an increase in rodent-borne diseases. “Swindon in Wiltshire is the latest town to suffer an infestation [in 2009 from pesticide-resistant rats], with exterminators reporting a 500 per cent increase in the rodents. Many are turning to traps, air rifles and even dogs in an effort to keep the populations under control” (Moore). The Center For Disease Control and Prevention listed at least six different rat-related health hazards and diseases, many of which result in serious infections and death. These include rat-bite fever (RBF), leptospirosis, and eosinophilic meningitis. With growing numbers of resistant pests, countries around the globe may soon face public health disasters as the number of insect and rodent-borne disease cases skyrockets.

Pesticide resistance is truly a serious problem, and needs to be brought to global attention. It has the potential to create public health disasters such as increased pesticide exposure and more insect and rodent-borne diseases, just to name a few. However, pesticide resistance, which is caused when pests are repeatedly exposed to pesticides, can be combatted by pesticide rotation, using pesticides sparingly, using pesticides that break down quickly, using biological

control, rotating crops, and implementing integrated pest management.

Organizations such as the Insecticide Resistance Action Committee and the National Agricultural Pesticide Impact Assessment Program are combating resistance by promoting education. Educating citizens on the methods used to combat pesticide resistance could prevent numerous health disasters, both in our country and around the globe.

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