

ENVIRONMENTAL RISKS OF GENETICALLY ENGINEERED FOODS

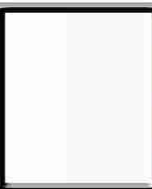


Genetically engineered crops and the environment

Genetically engineered crops pose a range of serious environmental impacts, including damage to the soil, to insects, and to biodiversity. And although the impacts of a disastrous oil spill, for example, are without question severe, genetically engineered crops pose even more profound problems. As living organisms, once released into the environment they may never be recalled. So if a problem is discovered after crops have been introduced, correcting the mistake may prove to be impossible.

Inadequate data about the ecological risks of genetically engineered plants has been collected. For example, regulations in place to monitor impacts of field experiments have been sharply criticized by Congress's own investigative arm. Findings in a similar vein by other scientists concluded that, "It seems clear ... that both industry and government must improve their collection and interpretation of data." Yet according to ecologists, "It still is the case. A lot of the key experiments don't seem to be being done." Despite the fact that genetically engineered crops pose serious ecological risks and that adequate testing has not been done, they were planted commercially on over 74 million acres last year alone in the United States.

Below are some of the risks to consider.



Impacts on other non-target insects

Though the Monarch butterfly has been the most visible non-target species at risk, many other insects and species may also be unintended targets. Scientists have reported an experiment in which ladybugs, which prey on Colorado potato beetles, consumed fewer potato beetle eggs when potato Bt levels were high. And in work conducted by the Swiss government, researchers have reported that lacewing larvae, also an important component of many healthy agricultural ecosystems, took longer to develop and had a strikingly elevated mortality rate when they were reared on prey that were fed Bt-producing corn. EPA has largely ignored this research, and was taken to task by independent scientific advisors who criticized the agency's dismissal of the data. Other critical research on environmental hazards has not even been published and debated at all. For example, there are no studies on the indirect effects on bird populations that may result from a decline in European corn borer populations after use of Bt corn. The situation is the same for pollinators, as there are no published studies on the impact of Bt pollen on bees.

Soil impacts

Healthy soil is inextricably linked to a productive agriculture. Organisms that live in the soil contribute to recycling biological waste and providing essential elements for plant growth and nutrition. Our knowledge of soil communities in general is still very limited. And our knowledge of the impacts of genetically engineered crops on soil is even more so.

Work published in 1999 demonstrated for the first time – years after EPA approved commercialization – that Bt toxin is released into the soil through the roots of Bt corn plants, and that the toxin can remain active for at least 234 days. The authors concluded that there may be a risk to non-target insects and other organisms from the toxin. The limited research conducted in this area has turned up other findings that are cause for concern. Industry research has shown, for example, that earthworms living in soil exposed to Bt cotton gained 29.5 percent less weight, on average, than other earthworms. And studies recommended by the independent scientists convened by EPA still have not been done. These scientific advisors note that, "These studies are important to assess long-term environmental effects of Bt-containing crops." If the long-term impact of growing genetically engineered crops is damaging to our soil, all of agriculture is harmed.

The monarch butterfly story

Although genetically engineered crops are designed to kill targeted pests, the crops may have negative unintended impacts on other insects and species. The impact of genetically engineered crops on nontarget species has not been adequately examined. Most genetically engineered corn on the market produces a pesticide (*Bacillus thuringiensis* or Bt) in both every cell of the plant, as well as the pollen that leaves the plant and travels through the environment. In May 1999 researchers at Cornell found that monarch larvae feeding on plants dusted with Bt had a much higher mortality rate than those that did not, and that surviving larvae were stunted. Monsanto had to admit that it had not yet conducted its own research on the subject. The University of Iowa then conducted follow-up field research, and their results confirmed that monarchs are indeed at risk from certain varieties of genetically engineered corn.

Research recently published in the scientific literature has been cited by EPA as demonstrating that monarchs are at little risk from Bt corn. There are several important points to note about this premature conclusion. One, EPA's review process already missed one variety of genetically engineered corn that is toxic to monarchs in field conditions which turned out to be unpopular with farmers. Thus the regulatory system in place relies too heavily on chance, and not on adequate premarket review. Two, the research conducted has only looked at short-term toxicity to monarchs, and not what are termed sub-lethal effects, meaning what impact a low level of toxin will have over several generations. Three, the studies have been criticized by many scientists because they assume that monarchs only consume pollen, and not other corn tissue, which is not true. Anthers on milkweeds are also consumed, and contain higher concentrations of Bt toxin than pollen. The impact of consuming pollen and anthers has not been adequately studied.

Genetically engineered crops and pesticide use

Genetically engineered crops are perpetuating an agriculture dependent on large applications of synthetic chemicals instead of techniques like organic agriculture and integrated pest management which seek to reduce or eliminate these inputs. Between 1992 and 2000, despite a large increase in the planting of genetically engineered varieties in this country, the use of chemical pesticides in agriculture increased from 900 million pounds to 940 million pounds.

Over 70% of the global acreage of genetically engineered crops are planted to herbicide tolerant varieties, primarily soybeans. These crops are designed to withstand large blasts of toxic herbicides, which will kill nearly everything but the plant. The reality of genetically engineered crops is that they are perpetuating the paradigm of heavy chemical use, not moving us away from it. Genetically engineered soybeans are actually using more chemicals than their conventional counterparts, not less. In some cases, herbicide use has gone up 30% when using genetically engineered soybeans versus non-genetically engineered varieties.

During the past five years, the percentage of field corn treated with chemicals has remained essentially the same despite a significant increase in the amount of genetically engineered corn planted. In addition, a recent patent application filed by Novartis, one of the world's largest biotechnology companies, admitted that farmers may need to douse their fields with more pesticides. This includes carbamates, which are known to impact birds, fish, bees, and other farmland wildlife.

"The perception that everything is totally straightforward and safe is utterly naive. I don't think we fully understand the dimensions of what we're getting into."
Professor Philip James, Director of the Rowett Research Institute

Although there may have been some reduction in the use of toxic chemicals on the use genetically engineered cotton, this is likely to be a short lived phenomenon. Because crops engineered to produce their own insecticides produce the toxin throughout the plant's life, pests' ongoing exposure to the toxin promotes development of resistance to the toxin. Resistance to Bt has already been detected in certain insects, and scientists generally agree that the widespread use of Bt crops will lead to widespread insect resistance in a few years. Today nearly 1,000 major agricultural pests are immune to pesticides, a development unheard of only 50 years ago. These so-called "super pests" may wind up requiring even more toxic chemicals.

Genetically Engineered Fish May Drive Others to Extinction

Biotechnology companies are also genetically engineering fish; over 20 species have already been engineered, although none are yet commercially available. If transgenic fish escape from ocean pens into the environment, which is unfortunately a common occurrence, a study from Purdue University estimates it could take only 40 generations to wipe out the native species. The oversight of genetically engineered fish is being handled exclusively by FDA, despite the fact that the agency does not have expertise in areas such as marine ecology.

"An ecosystem, you can always intervene and change something in it, but there's no way of knowing what all the downstream effects will be or how it might affect the environment. We have such a miserably poor understanding of how the organism develops from its DNA that I would be surprised if we don't get one rude shock after another."

-Richard Lewontin, Professor of Genetics, Harvard University

Opposition

Although proponents of genetically engineered crops claim they are environmentally safe, these are the same companies (Monsanto, Dupont, Dow Chemical, etc.) that have a track record of releasing products into the environment claiming that the science behind them is sound, only to discover later that in fact they are not. For example, only after PCBs have become ubiquitous in the environment are we learning about their severe health and environmental risks. Despite the claims of these companies, which produce both pesticides and genetically engineered seeds, that their products will usher in a new area of chemical-free agriculture, in fact over 70% of the global acreage planted in genetically engineered crops are designed to withstand repeated spraying of toxic herbicides. In order to convince the public of the safety of their products, these agricultural biotechnology companies have publicly announced a public relations campaign to spend at least \$250 million over 5 years. Their hope is that by repeated television and newspaper advertising, they can convince the public that their products are safe. Thus the companies are spending hundreds of millions of dollars to convince the public to buy products that they refuse to label and have not adequately tested.

Solution

Genetically Engineered Food Alert is a coalition concerned with the protection of consumer rights, public health, and the environment as they relate to genetically engineered foods. In order to protect public health and the environment from the risks of genetically engineered foods, Genetically Engineered Food Alert has launched a nation-wide campaign with the following platform.

Genetically engineered food ingredients or crops should not be allowed on the market unless:

- Independent safety testing demonstrates they have no harmful effects on human health or the environment;
- They are labeled to ensure the consumer's right to know; and
- The biotechnology corporations that manufacture them are held responsible for any harm.



Who We Are

The State Public Interest Research Groups (State PIRGs) are a founding member of the Genetically Engineered Food Alert coalition. The founding GE Food Alert organizations have been joined by more than 200 prominent doctors, academics, scientists, farming organizations, and others in our call for action. Find more about our work at www.getfoodalert.org, or www.pirg.org/ge.

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