



## Pesticides in Paradise: Kaua'i Test Fields

*The Hawaiian islands have become a global epicenter for field testing new genetically engineered (GE or GMO) crops—dramatically driving up pesticide use on the islands.*

### Introduction

Five of the world's six largest GE seed and pesticide corporations (BASF, Dow, Pioneer/Dupont, Monsanto and Syngenta) use Hawai'i to field test new crops before they go to market. This trend is on the rise; in the past three years, the U.S. Department of Agriculture has granted over 100 new permits to these corporations for field trials in Hawai'i—more than anywhere else in the country.

This year, Syngenta moved its Hawai'i seed research operations to Kaua'i, an island half the size of Rhode Island. Along with Pioneer/DuPont, Dow and BASF, these corporations run open air field tests primarily on the southwest part of the island—often directly adjacent to where children live, learn and play.

### GE test fields = heavy pesticide use

Genetically engineered seeds are often designed to be used in conjunction with specific pesticides, requiring repeated applications of these chemicals. To develop GE crops, test fields on Kaua'i are sprayed almost daily with health-harming, "restricted-use" pesticides.



These pesticides drift on the wind to neighboring homes, schools and farms, and leach into water supplies, putting the health of thousands of Kaua'i residents—especially children—at risk. Research shows that children's developing bodies are particularly susceptible to the harmful effects of pesticides.

### KAUA'IANS SPEAK OUT

"We have a right to know what's being grown on the island and what harmful chemicals are being used in the process. And when pesticides are sprayed, we need protections in place."

—Lorilani Keohokalole-Torio, mother

### The "dirty little secret" of GE

Most GE seeds are intentionally designed to drive up pesticide use, boosting market share for pesticide industry products.

According to Dr. Charles Benbrook's research (Washington State University), GE crops are responsible for the additional use of 527 million pounds of herbicides in the first 16 years of commercialization. In 2011, GE crops used 20 percent more pesticides on average than non-GE crops.

Whether being tested on Kaua'i or planted in Iowa, herbicide-resistant GE crops—and the resulting increase in pesticide use—place the burden of increased costs and health risks on farmers and local communities.

**TABLE 1**

**Pesticide Use on Kaua'i GE Test Fields 2010-2012: Highest Volume**

PESTICIDE NAME	COMMON NAMES	POUNDS OF ACTIVE INGREDIENT (pre-diluted)
Atrazine	Aatrex, Actinite, PK, Atazinax, among several others	11,876
Chlorpyrifos	Lorsban, Dursban, among others	7,050
Paraquat	Gramoxone SL, Gramoxone SL 2.0	912

*Source:* Department of Agriculture 2012 response to research inquiry from Gerard Jervis and Kyle Smith.

## GE test fields on Kaua'i

The island of Kauai is 396,774.4 acres in size—less than half the size of Rhode Island. Almost 40 percent of the island is used for farming.

According to the Kaua'i County Tax Assessor and Hawaii Department of Agriculture, Syngenta, BASF, Pioneer/DuPont and Dow occupy nearly all of the leased agricultural lands in west Kaua'i—over 15,000 acres in close proximity to schools and residences. This leased property is routinely used to test new GE seeds.

In the process of testing new GE crops, Syngenta et al. use many of their “restricted-use” pesticide products—chemicals that have potentially negative impacts on the environment or human health and can only be applied by licensed professionals.

According to the State of Hawai'i Department of Agriculture, biotech corporations are by far the largest users of higher-risk, restricted-use pesticides on the island, totaling more than 18 tons of 22 different restricted-use pesticides in 2012.

### Contaminating communities

The GE test fields where these pesticides are sprayed are located across much of the island's prime agricultural real estate, frequently bordering residential communities. Chemicals drift on the wind or run off into the water, exposing residents to health risks.

The chemicals used on the test fields in Kaua'i include some of the most health-harming pesticides on the market. According to use data obtained from the Department of Agriculture, atrazine, chlorpyrifos and paraquat top the list.

There are no public pesticide reporting laws in Kaua'i that require readily accessible disclosure on restricted-use pesticide use; the usage data from 2010-2012 (see Table 1) was obtained from the Department of Agriculture and through legal proceedings. With no publicly accessible source for these data, Kaua'i residents are in the dark about which pesticides they're being exposed to and in what amounts—and the possible health impacts from this exposure.

### KAUAIANS SPEAK OUT

Howard Hurst has been a teacher at Waimea Canyon Middle School for more than 17 years. The school is approximately 100 yards from experimental test fields owned by biotech giant Syngenta:

“The fields near the school are sprayed with pesticides regularly throughout the year, but especially in fall and winter when school is in session. There are also prevailing coastal winds that move across the fields towards the school daily. We do not have public pesticide reporting and disclosure laws in Hawai'i.

Students and staff have regularly reported unsettling, chemical fuel-like smells, coinciding immediately or shortly after pesticides were applied on agricultural lands windward of the school.

In November 2006, after school staff including myself witnessed an application of pesticides by Syngenta on the adjacent fields, over 60 students reported to the health room complaining of severe headache, nausea, disorientation and flu-like symptoms.”



**Pictured above:** Waimea, nestled between GE test fields owned by Pioneer (DuPont) and Syngenta. **Photo credit:** Sol Kahn, Makana Designs

## Health Impacts

Health-harming pesticides applied on GE test fields expose neighboring communities to health threats ranging from acute poisonings to long-term effects like cancer, birth defects and learning disabilities.

The three most commonly used restricted-use pesticides—atrazine, chlorpyrifos and paraquat—are linked with serious human health impacts, even when people are exposed to low levels. Studies show children are particularly susceptible to health harms from pesticides, with effects that can last a lifetime, and children who live in intensively agricultural areas like Kaua'i are more likely to have childhood cancer.

### In school air & water

In a University of Hawai'i study—commissioned by the County of Kaua'i and Hawai'i Department of Agriculture— researchers found pesticides in the air inside and outside schools in every sample taken at three different school sites over a two-year period. One of the pesticides most frequently detected was chlorpyrifos, a drift-prone chemical increasingly linked to harmful impacts on children's developing brains and nervous systems.

Waimea Canyon Middle School was one of the sites where chlorpyrifos was detected, which is located about 100 yards from test fields owned by Syngenta. Atrazine, an endocrine-disrupting herbicide, was also found in a water sample from the school's drinking fountain; this sample was collected in February 2011 by the U.S. Department of Agriculture. In recent years, atrazine has been detected several times in Kaua'i water supplies.

#### Atrazine

Atrazine is known to contaminate drinking water. Banned in Europe since 2004 due to groundwater contamination risks, studies link this herbicide with a number of health problems, including reproductive issues, birth defects and cancer—even at low doses.

•**Endocrine disruption:** The science on atrazine's effects on reproductive development continues to grow. It alters the levels of key reproductive hormones in rats and can delay puberty. In male frogs, exposure to atrazine causes a kind of "chemical castration," causing them to develop female sex characteristics.

•**Reproductive effects:** Studies find associations between exposure to atrazine and reproductive effects including increased risk of miscarriage and reduced male fertility. Impacts on children include: low birth weight, an increased chance of any birth defect, associations with an abdominal birth defect (gastroschisis) and a birth defect of the nasal passages (choanal atresia).

•**Cancer:** Evidence for the carcinogenic potential of atrazine is growing, and exposure has been linked to elevated risk of breast and prostate cancer. In response to concerns raised by independent scientists, U.S. EPA is currently re-evaluating atrazine's carcinogenic potential.

#### Chlorpyrifos

Chlorpyrifos is an organophosphate insecticide known for its damaging effects on the human nervous system. It is prone to drift, and immediate symptoms of poisoning include headaches, agitation, inability to concentrate, weakness, tiredness, nausea, diarrhea and blurred vision. Exposure to higher doses can lead to respiratory paralysis and death. Additional impacts include:

•**Nervous system damage:** Exposure to low levels of chlorpyrifos may interfere with healthy development of the human nervous system. In addition to inhibiting crucial nervous

system enzymes, research suggests that chlorpyrifos disrupts the basic cellular machinery that manages brain cell and synapse growth.

•**Impacts on neurodevelopment:** Prenatal chlorpyrifos exposure was associated with a 7-point decrease in children's IQ, and with changes to the architecture of the brain, including regions of the brain that are sex-specific in structure.

•**Endocrine disruption:** Chlorpyrifos is also a suspected endocrine disrupting compound; moderate doses have been shown to alter hormone levels in animal studies. A recent review suggested chlorpyrifos is a "neuroendocrine disruptor," as chlorpyrifos's potential to disrupt sex-specific behaviors make it a risk factor for sex-biased neurodevelopmental disorders in children.

#### Paraquat

Paraquat is an acutely toxic herbicide and suspected endocrine disruptor. Its health impacts include:

•**Multi-organ failure:** Paraquat is known to damage the lungs, heart, kidneys, adrenal glands, central nervous system, liver, muscles and spleen—and can cause multi-organ failure.

•**Severe acute & long-term effects:** Health problems linked to paraquat include severe dermatitis, second degree burns, nosebleeds, rapid heart rate, kidney failure and respiratory failure.

•**Cancer & neurological effects:** In addition to links to skin cancer, there is mounting evidence connecting paraquat exposure to Parkinson's disease.

High toxicity and lack of an antidote mean that exposures to paraquat can lead to serious illness and even death.

For additional information, see [www.panna.org](http://www.panna.org)

## More transparency & pesticide protection needed

Federal and state laws have failed to protect Hawaiian children from the harms of pesticides. As a result, local governments have the right and responsibility to protect their communities—especially children—from hazardous and difficult-to-control pesticides. Kaua'i should not be a testing ground for unsafe and experimental pesticides. Instead, we should focus on sustainable, proven technologies that ensure the safety and prosperity of the island.

The good news is that across the country, local governments have stepped up as federal counterparts have failed to put children's health first. Counties in Washington,

for example, have created no-spray buffer zones around schools, homes and other places children live, learn and play.

Localized pesticide use reporting systems, for example, can allow farmers and families alike to track use and work towards overall pesticide reduction—especially of the most hazardous pesticides. Counties track many details about these applications, including time, amount and location in order to inform the best decision-making possible.

Many physicians and health professionals are speaking out about the dangers of pesticide exposure. The American Academy of Pediatrics recently released a statement calling for reduced overall use of hazardous pesticides, and reduced exposures for children. The health costs are simply too high.

### Policy recommendations

As we move toward reduction of the most hazardous pesticides, policymakers should consider the following steps:

- 1) **Right-to-know:** Families, farmers and physicians have a right to know what pesticides are being used and where. Information should be accessible to all well in advance of pesticide applications and should be made available online in public databases, posted in public places and on the doors of people living next to application sites.
- 2) **Robust evaluations:** Because of the uniqueness of the geography, and large scale open-air pesticide application and seed experimentation on Kaua'i, local policymakers can protect families by prioritizing timely investigation of health and environmental impacts. Kaua'i healthcare professionals require immediate information, an evaluation and lab protocol, and a commitment to timely research in order to effectively treat local Kaua'i communities.
- 3) **Critical protections:** When hazardous pesticides are used, critical protections should be created for the most sensitive populations, especially children. In Yolo County, California, for example, quarter-mile buffer zones have been created near schools for drift-prone pesticides like chlorpyrifos. Additionally, the neurotoxic pesticide isn't allowed to be used within 72 hours of rain or irrigation.
- 4) **Necessary restrictions:** In some cases, because of the nature of a hazardous pesticide, additional restrictions should be implemented to meet local conditions. For example, in conjunction with New York state, counties on Long Island have conducted additional evaluations of the hormone-disrupting herbicide atrazine in water; as a result, they have restricted use of the pesticide on the island.
- 5) **Support for farmers:** Hawaiian farmers need local, state and federal support for proven and safe agroecological practices that promote the resiliency of the Hawaiian land and safeguard natural resources. Training programs that emphasize cutting edge green practices, competitive grants that enable the purchase of equipment, and co-operative leasing programs can help farmers produce the healthy food necessary for local economies and farmers to prosper.

### Resources cited

Benbrook, C. (2012) "Impacts of genetically engineered crops on pesticide use in the U.S.—the first sixteen years." Environmental Sciences Europe, Vol. 24:24 doi: 10.1186/2190-4715-24-24, 28

Board of Water Supply, Kaua'i County: Meeting Minutes, August 28, 2012

Information Systems for Biotechnology (ISB) database: [USDA Field Test of GM Crops](#)

Public document requests: Kaua'i County Tax Assessor and Hawaii Department of Agriculture

Qing X. Li, Jun Wang and R. Boesch (2013). "Final Project Report for Kaua'i Air Sampling Study." University of Hawai'i

Schafer, K. and E. Marquez, et al. (2012) "A Generation in Jeopardy: How pesticides are undermining our children's health and intelligence." Pesticide Action Network North America

USDA PDP Groundwater Site results: "Waimea Middle School, February 2011."



### Pesticide Action Network North America

is part of an international network working to replace the use of hazardous pesticides with ecologically sound and socially just alternatives. To learn more, visit [www.panna.org](http://www.panna.org).