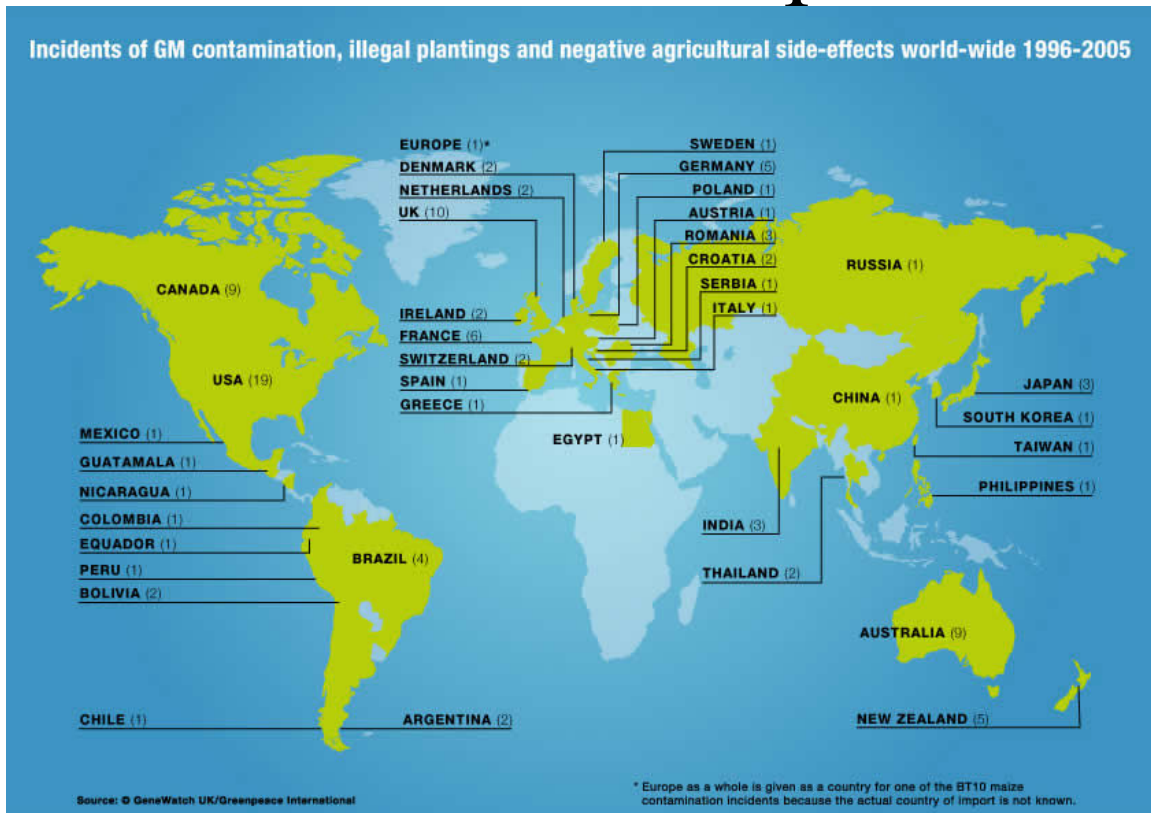


# Exploring Coexistence of Diverse Farming Practices

## Alternative Report



*“Coexistence = Contamination”*

October 2005 – February 2007

**Organic Farmers:**

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### INTRODUCTION

For the past year, conventional, organic and biotech farmers, state agencies and interested stakeholders met in Honolulu to discuss “co-existence” of farming practices. This group formed three committees. Each of the committees attempted to come up with recommendations to the Legislature for their portion of the exercise. The committees were called Biological Drift, Chemical Contamination and Seed Supply. Their recommendations were summarized in the [Exploring Coexistence: Preliminary Best Management Practices of Diverse Farming Practices](#). This Alternative Report, written by a group of the farmers who also attended these meetings, arose out of the need to accurately communicate and highlight many of the problems, legal battles, and governmental initiatives surrounding the new technology of genetic engineering of agricultural crops.

The mandate which created the “coexistence” meetings, sponsored by the Hawai‘i Farm Bureau Federation, arose out of a legislative resolution to “develop a framework of successful coexistence with mutual success and prosperity for all agricultural producers.” This framework is to be founded on “fact and demonstrable science.” However, these two statements both from S.C.R. 208 (2005 Hawai‘i Legislative Session)<sup>1</sup> are a perfect example of the difficulties that have arisen in attempting to discuss and arrive at protocols that would allow conventional, organic and biotech farming to exist side by side.

If one looks at the *science* of biotech agricultural crops that has emerged over the past months and years, there is a long and growing trail of obstacles to “coexistence.” There are mounting studies, news reports and obvious *demonstrable science* that point to the impossibility of coexistence as a sound biological concept.

The European Union has attempted to solve this inconsistency with a complex and costly system of liability and litigation (the producer pays). Will these policies stop GMO genes from moving into conventional or organic crops? Certainly they will not, biology does not follow the law. However, it is a possible first step to protect Hawai‘i’s farmers.

The Senate Resolution states that “the long term prosperity of Hawai‘i’s agricultural community depends significantly on diversity.” It then suggests that all farmers must have the “opportunity to choose which farming practices will be best.” This creates another impossible outcome. Since GMO genes cannot be contained in the natural world by talking to your neighbors, or allowing state agencies to *police* neighbors, or controlling wandering bees, patented genes over time will invade the non-GMO crops of the farmers in Hawai‘i actually creating *less* diversity. This is the opposite of what the legislature has intended.

In most instances, one would agree that diversification increases health in farming. But to then extend this concept to all systems of agriculture is faulty. If one system has the ability to dominate others, then there is not an equal playing field. GMO genes have been found to become dominant in many situations. This genetic material is intellectual property owned by corporations. Their travel plans cannot be charted with accuracy. This puts the conventional and organic farmers at a loss. Was this the intention of the legislature? Probably it was not.

The resolution states that “ the transfer of knowledge and technology in many new areas of agriculture, have and will continue to provide substantial benefits to human health and the environment.” A pesticide in every cell or resistance to herbicides can be seen as practical for weed management, but this does not outweigh the mounting evidence of costs to human and health and the environment. Additionally, the loss of conventional and organic markets due to contamination with herbicide resistant GMO genes clarifies that these new technologies weaken, not strengthen our agricultural sector.

What these meetings of conventional, organic and biotech farmers could accomplish are sound recommendations to the Legislature regarding issues of “growing genetically engineered crops in Hawai’i.” If the Legislature desires knowledge and recommendations for the future, perhaps a more realistic discussion would include a Roundtable of Stakeholders who could wrestle with the following:

1. An assessment of the status of the genetic engineering of agriculture in Hawai’i.
2. An investigation of the federal, state and local laws that exist to regulate GMO, the identification of regulatory gaps about which the state should be concerned, and creation of policy to monitor these gaps.
3. An analysis of the health, environmental, economic, social and cultural risks associated with the growing of GMO crops in the state.
4. A discussion about how the state will protect farmers who choose not to grow GMO crops?
5. Is co-existence biologically possible?

Biological organisms, which include genetic materials, pollen, and seed, are alive. They are meant to reproduce. The crossing of GMO genes with conventional and organic crops could lead to significant market loss for these growers.

Genetically engineered crops have not been *proven* to be safe. Experimental field trials have undergone no environmental assessments. APHIS has begun to doubt its own regulatory process after its 2005 Audit.<sup>2</sup> If one does not look at the effects of this technology, chances are one will not see any risks. The legislature is charged by law to

protect the lands of Hawai'i and to support Hawai'i's farmers. From the view of an organic farmer, in asking all farmers to "co-exist", this resolution has created an impossible task. However, a new kind of thinking can emerge which could give the legislature more accurate information which would enable them to protect and preserve Hawai'i's environment for future generations, upon which our very lives depend.

*Note on the Traditional Seed Supply*

*The seed supply group was able to come up with Best Management Practices (BMP)s for Seed Producers including 60 ft.s of separation to avoid commingling of patented transgenic seed. They were able to define the Traditional Seed Supply as the plants in the growing environment of the farmer. However, were not able to develop a BMP for this, as it would require that no GMO varieties of that crop be grown in the pollen or seed transfer ranges of that farm. Thus, when a GMO crop is field tested or commercially released, the traditional seed supply for that crop in that region has been compromised.*

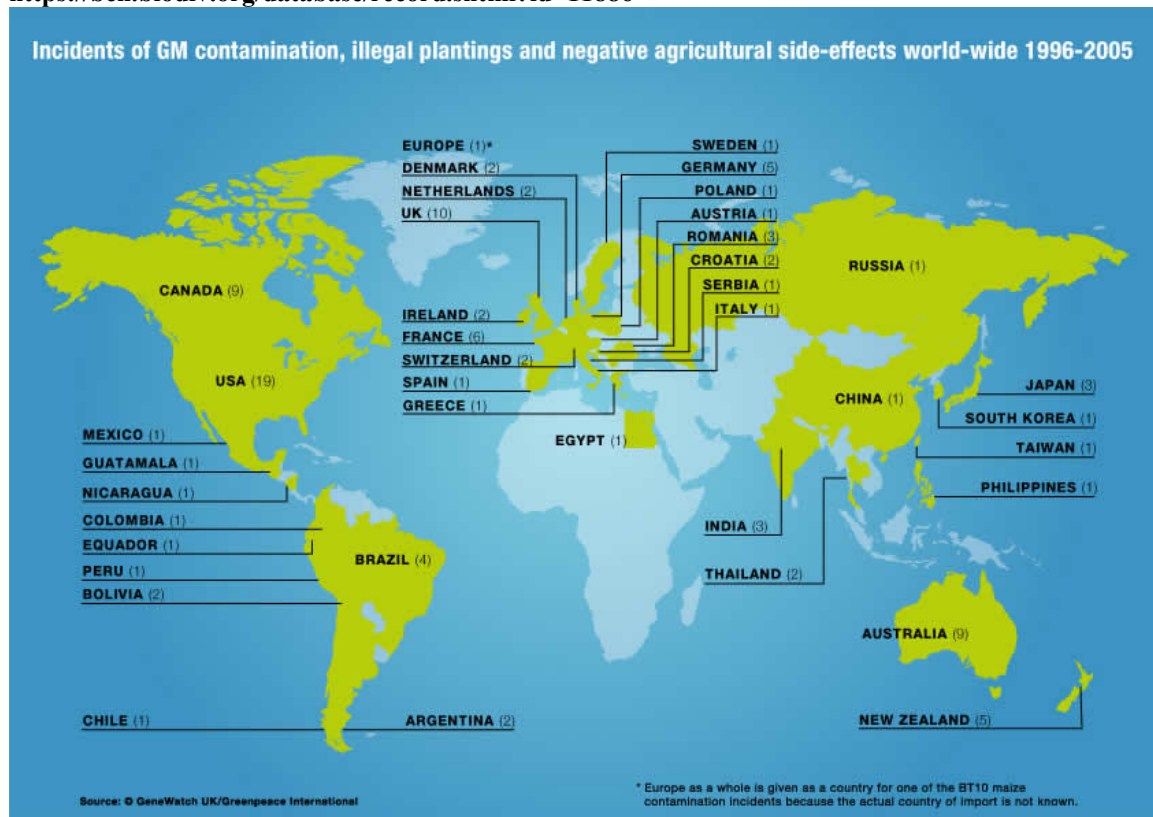
## EVIDENCE

The obstacles to co-existence include contamination, liability and economic harm. A few of the many related scientific studies and reports are listed below. This section is divided into two parts- contamination incidents worldwide and GMOs in Hawai'i.

### GMO Contamination Incidents:

The Biosafety Clearing-House at the Secretariat of the Convention on Biological Diversity housed by United Nations Environment Program has a GM Contamination Register listing all publicly acknowledged GMO Contamination Incidents. Several of the 113 Registered Contamination Incidents as of 2005 (19 in the US) are highlighted with documentation below as well as 2006 incidents.

<https://bch.biodiv.org/database/record.shtml?id=11886>



**Bentgrass-** August 16, 2006 this GMO Roundup-ready grass designed for golf courses was found to have escaped its field trials and crossed with wild relatives in Oregon. It was found 13 miles away and crossed with 12 other species of native grass in Siskiyou National Forest.<sup>3</sup> February 6, 2007 past trials on genetically engineered Creeping Bentgrass were ruled illegal by a federal district judge and that the USDA must halt new field trials until more vigorous environmental reviews are conducted.<sup>4</sup>

•'Grass Created in Lab Is Found in the Wild', Andrew Pollack, *New York Times*, August 16, 2006,  
•'Past Trials on Genetically Engineered Creeping Bentgrass Ruled Illegal' Joseph Mendolson, Center for Food Safety February 6, 2007 Memorandum Opinion

**Rice-** In 2006, an unapproved, experimental strain of Bayer Crop Science a Liberty Link Long Rice (LLRICE601) was found to have contaminated US stocks of commercial long

rice. Japan suspended long rice importation, Europe is requiring testing and certification, US rice market has dropped dramatically, US rice farmers are suing Bayer, and contamination by this strain has been found in rice in Europe.<sup>5</sup> Additionally, an illegal GMO rice from China has been found in European food products. By 2007, the global rice industry is in crisis with GMO contaminated rice showing up in 25 countries and rice exporters rejected GMO rice.<sup>6</sup>

- **'US rice farmers sue Bayer Crop Science over GM rice', Reuters, 8/28/06,**
- **'EU: Food COs Risk Legal Action If Import Illegal GMO Crop's', The Wall Street Journal, September 6, 2006,**
- **'Rice Industry in Crisis' Greenpeace Report January 2007.**

**Corn-** In August 2006, the federal district court ruled that the USDA did not follow their own laws in allowing biopharmaceutical field trials in Hawaii.<sup>7</sup> In 2003, the EPA took action against Pioneer Hi-Bred and Mycogen for violating restrictions in their permits to grow experimental GMO corn on Kauai and Molokai.<sup>8</sup> US strains of GMO corn were found in Mexico at the center of origin for corn have contaminated local land races.<sup>9</sup> In 2004, The Union of Concerned Scientists tested commercial non GMO seed stock; 50% of seeds tested had GMO contamination.<sup>10</sup> In 2002, the USDA announced it had quarantined over 2.7 million worth of soybeans (500,000 bushels) destined for human consumption after finding stocks of Prodigene's GM biopharmaceutical corn mixed with the soybeans. In 2001, a variety of GMO corn only approved for animal feed, Starlink, was found in taco shells costing the government 1 billion dollars to clean up.<sup>11</sup>

- **'Gene-Altered Crops Denounced Environmental Groups Seek Moratorium on Open-Air Tests', Rick Weiss, Washington Post, August 16, 2006**
- **'EPA fines two biotech seed production companies for mishandling experimental crops' December 2002.**

• **Quist, D, & Chapela, I.H. (2001) Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico. Nature 414: 541-543.**

• **'Gone to seed. Transgenic contaminants in the traditional seed supply' Union of Concerned Scientists 2004,**

• **'The Starlink Affair' Friends of the Earth, Bill Freese.2001**

**Canola-** In a study of traditional canola seed stock in Western Canada by the University of Manitoba, 34 out of 35 show GMO contamination.<sup>12</sup> In 2005, GMO Canola was found growing wild around the ports in Japan, a country that bans all GMO crops.<sup>13</sup> In 2004, The Union of Concerned Scientists tested commercial non GMO seed stocks; 83% of seeds tested had GMO contamination.<sup>14</sup>

- **'Evidence of Contamination of Pedigreed Canola of Western Canada with Genetically Engineering Herbicide Resistance Traits', Lyle Friesen, Agron. J. 95:1342-1347(2003)**
- **'Trend: Serious GM canola pollution in Kashima port, Ibaraki Prefecture', August 2004, Bio Journal**
- **'Gone to seed. Transgenic contaminants in the traditional seed supply' Union of Concerned Scientists 2004,**

**Papaya-** In 2004, Hawaii SEED found 50% of non-GMO papayas tested on the Big Island to have some GMO contamination; the University of Hawaii non-GMO seed

source was also contaminated in 2004 and again in 2006.<sup>15</sup> All economic indicators (based on USDA data) show a decrease in the Papaya industry since the introductions of the GMO papaya in 1998.<sup>16</sup> GMO papaya contamination has also occurred in Thailand, Hong Kong, and Taiwan where they have had field trials.

•‘**Hawaiian Papaya: GMO Contaminated**’, **Hawaii SEED 2006**,

•‘**The Failure of GE Papaya in Hawaii**’, **Greenpeace, 2006**,

**Tomato-** GMO tomato seeds from University of California at Davis Charles M. Rick Tomato Genetics Resource Center (a repository for tomato seed, meant to safeguard the gene pool of tomatoes) were accidentally shipped to researchers around the world over a seven year period, because the university scientists didn't realize that they contained biotech genes.<sup>17</sup>

•‘**Biotech seeds shipped in error: Over a 7-year period, UCD sent researchers the tomato samples**’, **Mike Lee & Edie Lau Sacramento Bee 12/19/03**

**Superweeds-** Over-reliance on a single herbicide type inevitably leads to resistant weeds, and there are now 7 confirmed naturally “Roundup Ready” species contending with the crops in the US.

<http://www.weedscience.org/summary/MOASummary.asp>

#### GMOs in Hawai'i:

- **Field Trials-** Hawai'i has the most open-air GMO field trials of any state or any nation in the world. Locations are CBI (Confidential Business Information). These tests included bio-pharmaceuticals (drugs grown in food crops). In February 2005 US District Court ruled that plaintiffs were entitled to know the precise location and genes being tested in experimental biopharm trials. For the past 15 years, no EAs have been performed for any GMO field trial, nor have studies been conducted to determine if experimental genes have escaped into surrounding farms.
- **Papaya-** Released in 1998 to combat a virus outbreak, the GMO papaya is resistant to the ringspot virus, but has added to this failing industry's economic problems.<sup>18</sup> Loss of international markets, a low price point, increased pesticide costs, and \$700-800/acre of testing costs for non-GMO growers all have taken their toll on farmer's resources. GMO contamination<sup>19</sup> of mixed farmers' and organic growers' papayas have also caused market losses and questionable seed integrity on Hawai'i Island.
- **Coffee-** Hawai'i's Coffee Industry has been in consensus since 2002 on their rejection of GMO coffee. If GMO coffee (even a field trial) was planted in a coffee growing region, there could be contamination of the crop in the first generation. Japanese, European, specialty and organic markets would be compromised. Currently there are no laws prohibiting the growing of GMO coffee in Hawai'i or other forms of protection from the State of Hawai'i.

- **Taro-** Native Hawaiians and taro farmers have strongly objected to the genetic modification of taro, from lab to field. They are concerned with the genetic violation of a sacred member of their genealogy as well as GMO contamination of their main staple food. In 2006, they successfully lobbied the University of Hawai'i to drop patents that it held on three hybrid taros (non-GMO).<sup>20</sup>
- **Algae-** The algae industry has now surpassed papaya in value.<sup>21</sup> Primarily focused on health food supplements, recent attempts to grow a GMO bio-pharmaceutical algae in Kona ended when the 3<sup>rd</sup> Circuit Court ruled that an Environmental Assessment (EA) must accompany the field trial and production.<sup>22</sup>
- **Pineapple-** Some pineapple growers have noted that their industry has become a specialty, niche crop instead of a commodity. One of the larger growers on Maui has a no GMO policy. GMO varieties will not work for these markets, and they are looking at other solutions to their pest issues.
- **Seed Corn-** This industry is currently reporting itself at \$112 million value to Hawai'i. Approximately half of this seed grown is GMO. These large companies do not create a product, just the parent lines for seed to be grown out on the mainland. Their contribution to Hawai'i is payment for land, inputs, and labor. There has not been testing of corn to see the extent of contamination from their experiments.
- **Sustainable Agriculture-** Hawai'i is seeing an increase in demand for organic products, farmers' markets, a proliferation of the buy local ethic, local seed exchanges, and a demand for organic research. Successful industries are growing niche tropical crops for international specialty markets. These are clear indicators that our consumers and farmers want a more sustainable future for agriculture. This desire from the community, coupled with the limited supply and increasing prices of fossil fuels, have created a need for caution and foresight. Our food security is dependent on our ability to grow locally available and appropriate seed.



## **Consequences for Hawaii's Farmers and Community**

There are consequences for Hawai'i if we continue on the biotech path. Contamination will be inevitable. There is no GMO crop in the world that has not contaminated its conventional & organic counterparts- corn, canola, soy, cotton, bentgrass, rice, and papaya. We will lose markets when contamination occurs (current losses include those farmers selling to Europe, Japan, the organic and specialty markets). Testing is prohibitively costly. Access to testing can be difficult to obtain in Hawai'i. Farmers could be liable for accidentally growing patented genes. State or corporations could be liable for cleanup, if massive contamination occurs. Labeling and disclosure are not required. This prevents traceability of the food supply. Aerial pollen transfer could be dangerous for those working or living near experimental gm crops. These are a few of the known consequences that Hawai'i will be facing if it continues to release GMO crops into our open air.

## CONCLUSION

Healthy and equitable co-existence is not possible. When a GMO crop is released into the natural world (even in a field trial), there exists the probability of contamination of conventional and organic crops.<sup>23</sup> Separation schemes and cultural practices can *reduce*, but not *prevent* contamination. Other consequences include: economic harm through market loss (foreign, specialty, & organic), increased testing costs, and contaminated seedlines for conventional and organic growers. Giving a farmer the new choice to use biotech seeds compromises the rights of all other farmers to grow conventional and organic crops. Our current laws do not provide a framework of liability and consequences for these escaped genes and the subsequent economic harm. Everyone from farmers to legislators needs more information on these crops and their costs and harms. They have been introduced and proliferated without all stakeholders being given a voice. While these new technologies solve a few production problems, they bring with them mounting economic, social, and environmental costs that do not outweigh the benefit.

## RECOMMENDATIONS:

1. Hawai'i State legislature should take a time out on all open-air field testing and release of new commercial GMO crops in our islands until risk and environmental assessments are available for each crop tested.
  - a. We need new economic studies on the costs and benefits of growing GMO crops in Hawaii. Costs incurred thru the contamination of conventional and organic farmers' crops of that industry as well environmental and human health costs should be included.
2. Hawai'i should pursue new, cutting edge sustainable options.
  - a. Our biotech expertise can be used in Marker Assisted Selection (MAS) to read genomes and breed seed conventionally, thus keeping all markets types.

- b. Hawai'i will be most successful with diversified specialty and niche agricultural products. Organic markets are growing at greater than 20% per year.

“The coexistence of genetically modified (GM) crops and non-GM crops is a myth because the movement of transgenes beyond their intended destinations is a certainty, and this leads to genetic contamination of organic farms and other systems. It is unlikely that transgenes can be retracted once they have escaped, thus the damage to the purity of non-GM seeds is permanent. The dominant GM crops have the potential to reduce biodiversity further by increasing agricultural intensification. There are also potential risks to biodiversity arising from gene flow and toxicity to nontarget organisms from herbicide-resistant (HT) and insect-resistant (Bt) crops. Unless whole regions are declared GM agriculture free, the development of distinct systems of agriculture (GM and non-GM) will be impossible as GM agriculture emerges at the expense of all other forms of production.”

-Miguel A. Altieri, Professor of Agroecology, University of California at Berkeley, ‘The Myth of Coexistence: Why Transgenic Crops Are Not Compatible With Agroecologically Based Systems of Production,’ Bulletin of Science, Technology and Society, August 2005

<sup>1</sup> S.C.R. 208 (2005 Hawai'i Legislative Session) [www.capitol.hawaii.gov/session2005/bills/scr208\\_.htm](http://www.capitol.hawaii.gov/session2005/bills/scr208_.htm)

<sup>2</sup> Audit Report: Controls Over Issuance of Genetically Engineered Organism Release Permits, USDA December 2005  
<http://www.usda.gov/oig/webdocs/50601-08-TE.pdf>

<sup>3</sup> ‘Grass Created in Lab Is Found in the Wild’, Andrew Pollack, New York Times, August 16, 2006, [www.nytimes.com/2006/08/16/science/16grass.html](http://www.nytimes.com/2006/08/16/science/16grass.html)

<sup>4</sup> ‘Past Trials on Genetically Engineered Creeping Bentgrass Ruled Illegal’ Joseph Mendolson, Center for Food Safety February 6, 2007 [http://www.centerforfoodsafety.org/GTBC\\_DecisionPR\\_2\\_7\\_07.cfm](http://www.centerforfoodsafety.org/GTBC_DecisionPR_2_7_07.cfm)  
Memorandum Opinion [www.centerforfoodsafety.org/pubs/GTBC\\_Doc\\_94\\_opinion%202-5-07.pdf](http://www.centerforfoodsafety.org/pubs/GTBC_Doc_94_opinion%202-5-07.pdf), <http://www.ktvz.com/story.cfm?nav=news&storyID=18386>

<sup>5</sup> ‘US rice farmers sue Bayer CropScience over GM rice’, Reuters, 8/28/06, [today.reuters.com/News/CrisesArticle.aspx?storyId=N8S372113](http://today.reuters.com/News/CrisesArticle.aspx?storyId=N8S372113); ‘EU: Food COs Risk Legal Action If Import Illegal GMO Crop’s’, The Wall Street Journal, September 6, 2006, <http://www.truthabouttrade.org/article.asp?id=6275>

<sup>6</sup> ‘Rice Industry in Crisis’ Greenpeace Report January 2007. [www.greenpeace.org/raw/content/international/press/reports/rice-industry-in-crisis.pdf](http://www.greenpeace.org/raw/content/international/press/reports/rice-industry-in-crisis.pdf)

<sup>7</sup> ‘Gene-Altered Crops Denounced Environmental Groups Seek Moratorium on Open-Air Tests’, Rick Weiss, Washington Post, August 16, 2006. [www.washingtonpost.com/wp-dyn/content/article/2006/08/15/AR2006081501053.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/08/15/AR2006081501053.html)

<sup>8</sup> ‘EPA fines two biotech seed production companies for mishandling experimental crops’ December 2002. [epa.gov/region09/enforcement/2003pesticides.html](http://epa.gov/region09/enforcement/2003pesticides.html)

<sup>9</sup> Quist, D., & Chapela, I.H. (2001) Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico. *Nature* 414: 541-543. [www.nature.com/nature/journal/v414/n6863/abs/414541a.html](http://www.nature.com/nature/journal/v414/n6863/abs/414541a.html)

<sup>10</sup> ‘Gone to seed. Transgenic contaminants in the traditional seed supply’ Union of Concerned Scientists 2004, [www.ucsusa.org/food\\_and\\_environment/genetic\\_engineering/gone-to-seed.html](http://www.ucsusa.org/food_and_environment/genetic_engineering/gone-to-seed.html)

<sup>11</sup> ‘The Starlink Affair’ Friends of the Earth, Bill Freese.2001. [www.biotech-info.net/starlink\\_report\\_FOE.pdf](http://www.biotech-info.net/starlink_report_FOE.pdf)

<sup>12</sup> ‘Evidence of Contamination of Pedigreed Canola of Western Canada with Genetically Engineering Herbicide Resistance Traits’, Lyle Friesen, *Agron. J.* 95:1342-1347(2003)

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<http://agron.scijournals.org/cgi/content/abstract/95/5/1342>

<sup>13</sup> ***'Trend: Serious GM canola pollution in Kashima port, Ibaraki Prefecture', August 2004, Bio Journal, www5d.biglobe.ne.jp/~cbic/english/2004/journal0408.html***

<sup>14</sup> 'Gone to seed. Transgenic contaminants in the traditional seed supply' Union of Concerned Scientists 2004, [www.ucsusa.org/food\\_and\\_environment/genetic\\_engineering/gone-to-seed.html](http://www.ucsusa.org/food_and_environment/genetic_engineering/gone-to-seed.html)

<sup>15</sup> 'Hawaiian Papaya: GMO Contaminated', Hawaii SEED 2006, [www.gmofreemaui.com/content.php?article.24](http://www.gmofreemaui.com/content.php?article.24)

<sup>16</sup> 'The Failure of GE Papaya in Hawaii', Greenpeace, 2006, <http://www.greenpeace.org/raw/content/international/press/reports/FailureGEPapayainHawaii.pdf> - search="greenpeace papaya economic failure report"

<sup>17</sup> 'Biotech seeds shipped in error: Over a 7-year period, UCD sent researchers the tomato samples', Mike Lee & Edie Lau Sacramento Bee 12/19/03

[www.sacbee.com/static/live/news/projects/biotech/archive/121903.html](http://www.sacbee.com/static/live/news/projects/biotech/archive/121903.html)

<sup>18</sup> 'The Failure of GE Papaya in Hawaii', Greenpeace, 2006,

<http://www.greenpeace.org/raw/content/international/press/reports/FailureGEPapayainHawaii.pdf> - search="greenpeace papaya economic failure report"

<sup>19</sup> 'Hawaiian Papaya: GMO Contaminated', Hawaii SEED 2006, [www.gmofreemaui.com/content.php?article.24](http://www.gmofreemaui.com/content.php?article.24)

<sup>20</sup> 'Hawaiians, Farmers Force UH to Abandon Taro Patents; Demand Dialogue on Patenting of Hawaiian Biodiversity', The Molokai Times, June 20, 2006 [www.molokaitimes.com/articles/6619155910.asp](http://www.molokaitimes.com/articles/6619155910.asp)

<sup>21</sup> 'Papaya Production Takes a Tumble' March 19, 2006, Sean Hao Honolulu Advertiser [the.honoluluadvertiser.com/article/2006/Mar/19/bz/FP603190311.html](http://the.honoluluadvertiser.com/article/2006/Mar/19/bz/FP603190311.html)

<sup>22</sup> 'Hawaii Court Orders Environmental Review for Biopharm Algae', Kailua-Kona, Hawaii, October 12, 2005 Environmental News Service [www.ens-newswire.com/ens/oct2005/2005-10-12-09.asp#anchor4](http://www.ens-newswire.com/ens/oct2005/2005-10-12-09.asp#anchor4)

<sup>23</sup> GM Contamination Register, The Biosafety Clearing-House at the Secretariat of the Convention on Biological Diversity housed by United Nations Environment Program. <https://bch.biodiv.org/database/record.shtml?id=11886>