In Biotech We Trust?
Having Faith in the Companies That Genetically Engineer Our Food

A Pesticide Action Network North America/Genetically Engineered Food Alert backgrounder

By Skip Spitzer

Large agricultural biotech companies—such as Monsanto, Aventis, Syngenta, Dow and DuPont—are marketing genetically engineered crops, many of which are quietly being used as ingredients in your food.[*] These giant companies claim such crops "have been proven safe"[1] for people and the environment—and they want you to believe it. Are the big biotech crop corporations worthy of your trust?

Trust betrayed: Pesticides

Many of the big biotech crop companies are also pesticide companies. In fact, the three that dominate the market—Monsanto, Aventis, and Syngenta[2]—are also among the top seven pesticide companies worldwide.[3] And the pesticide companies—part of a more than $30 billion a year industry[4]—have a long, disgraceful record of presuming, overstating, concealing and lying about the impacts of their products. Consider the following cases.

"DDT is good for me"

DDT[†] was developed to control insects on agricultural crops and that carry diseases like malaria. Chemical industry ads described DDT as a miraculous development. One company claimed that "Exhaustive scientific test have shown that, when properly used, DDT…is a benefactor of all humanity….Today, everyone can enjoy added comfort, health and safety through…DDT."[5] (See ad this page.)

Yet research presented in Rachel Carson's groundbreaking book *Silent Spring*[6] and elsewhere made clear that such claims were way off the mark. Carson demonstrated that pesticides such as DDT make their way irrevocably into the food chain, where their levels build up in plants and in the fatty tissues of fish, birds, and animals (including humans). She showed that DDT caused the deaths of thousands of birds, bringing some species to the brink of extinction.[7]

DDT is an endocrine disruptor (a chemical that interferes with hormone function) and is a developmental and reproductive toxin.[8] At high levels of human exposure, DDT can damage the nervous system, causing symptoms such as excitability, tremors, and seizures. The Department of Health and Human Services has determined that DDT may reasonably be anticipated to be a human carcinogen.[9]

After approximately 1,350,000,000 pounds were used in the U.S.,[10] DDT was banned domestically in 1972, except for public health emergencies.[11] It is still used, legally and illegally, in many countries.[12]

Keeping quiet about DBCP

The fumigant DBCP[‡] was manufactured by several companies, including Dow Chemical. It reduces sperm counts in men, and is an "EPA probable carcinogen," ground water contaminant and suspected endocrine disruptor[13].

Dow says, "It is our regular policy wherever to totally inform people about what the material is that they're working with and what its potential is." Yet Dow knew of DBCP's reproductive danger for decades. In

[*] The food industry estimates that more than 60% of all non-organic processed foods sold in U.S. stores contain genetically engineered ingredients. Brett Chase, "Novartis Eliminates Gene-Altered Ingredients From Food Products," *Bloomberg*, 3 August 2000, 15:7.

[†] DDT stands for dichloro-diphenyl-trichloroethane.

[‡] DBCP stands for 1,2-dibromo-3 chloropropane.

1958, the Dow Chemical Company Biochemical Research Laboratory wrote, "Testicular atrophy may result from prolonged repeated exposure" and recommended a lower exposure standard. Dow treated the report as "internal and confidential" and did not reduce exposure levels.[14]

Nor did Dow inform workers in its DBCP manufacturing plants or in agricultural fields.[15] One plant worker said,

> They ran a series of [tests and] all my sperm counts came up zero. And I'd never been told in the whole time…that this might happen to me.

Another planter worker said,

> After telling me that I shouldn't worry about anything out there because it can't hurt me, now to find out that I'm sterile from it, their answer was, don't worry about that because you can always adopt children.[16]

Studies mounted showing harm from DBCP, including one that revealed that DBCP plant workers "with more than 90 days exposure had markedly impaired sperm counts, and as many as 70 percent were sterile."[17] DBCP was permanently banned in 1979—although excessive exposure continues through contaminated water supplies.[18]

Overstating glyphosate

Monsanto's herbicide Roundup, which contains the active ingredient glyphosate, accounted for 67% of its total sales in 2000.[19] The company claimed in advertising that Roundup is "safer than table salt," and "can be used where kids and pets play, and breaks down into natural material."[20]

While on the low end of the toxic scale, Roundup is hardly the harmless potion Monsanto would have you believe. Roundup is associated with an increased risk of miscarriages and premature birth.[21] One study reported that between 1984 and 1990 glyphosate was the most commonly reported cause of pesticide illness among landscape maintenance workers. Another found it to be the third most commonly reported cause of pesticide illness among agricultural workers in California.[22] Moreover, some researchers point out that additional research is needed on the long-term effects of glyphosate and the impact of the so-called "inactive" ingredients in glyphosate formulations.[23]

In fact, New York Attorney General Dennis Vacco called Monsanto's advertising claims "particularly troubling" and in a legal settlement in 1997 forced the company to remove misleading statements from its ads in New York state.[24]

Many more cases

There are many more cases of hazardous pesticides in which the industry self-servingly presumed, overstated, concealed or lied about the facts: atrazine, benomyl, chlorpyrifos, lindane, malathion, parathion and paraquat—to name just a few. In general, the industry portrays the impacts of pesticides as slight. Yet decades of research has demonstrated that modern pesticide use causes widespread human and environmental harm, creates resistant pest populations, contributes to declining crop yields, undermines local and global food security and threatens agricultural biodiversity.[25] The World Health Organization estimates that pesticides cause about 37,000 cases of cancer a year.[26]

Trust betrayed: Genetically engineered crops and foods

Today the big pesticide companies have combined with seed and biotech companies to develop and market genetically engineered crops. The biotech crop companies have found, however, that millions of people around the world are concerned about the health and environmental impacts of genetically engineered foods. In response, these giant corporations are claiming revolutionary benefits and negligible risks. As the following cases make clear, however, once again the public's trust has been betrayed.[27]

Feeding the world with genetic engineering

Perhaps the industry's most emotionally powerful claim about genetically engineered crops is that they are needed to combat hunger. In fact, Monsanto boldly ran an advertisement claiming that "Worrying about starving future generations won't feed them. Food biotechnology will."[28]

There is little evidence that biotech crops produce more food.[29] Even if they did, however, hunger has little to do with the general volume of food produced. As the United Nations Food Programme reports, there is enough food produced worldwide to feed everyone one and a half times over.[30] Even in the U.S., the largest economy in the world, about 36 million people (nearly 40% of them children) do not have access to enough food.[31]

Clearly, hunger is therefore a matter of poverty and access to resources, not simple abundance. Even one ag-biotech executive acknowledged this, saying:

> If anyone tells you that [genetically engineered crops are] going to feed the world, tell them…to feed the world takes political and financial will—it's not about production and distribution.[32]

Similar to the "feed the world" claim, the biotech industry is claiming that so-called genetically engineered "golden rice" is the great hope for curing blindness and other afflictions caused by malnutrition. Again the facts tell a different story. (See Box 1.)

The "it's the same" claim

Ag-biotech assures us that genetically engineered food crops are, as in the words of Monsanto, "basically the same as conventional foods."[33] This assertion, also made by the Food and Drug Administration (FDA)[34] against the objections of some of its own scientists,[35] has become known as "substantial equivalence."

Dissenting scientists point out that, despite common claims to the contrary, inserting genes is in many ways very imprecise. Engineers cannot determine where, or how many, foreign genes end up in a host organism's DNA. This random insertion can create changes with unpredictable effects. In fact, with such a wide range of possible genetic alterations, microbiologist, medical doctor, and Professor of Food Safety Richard Lacey said, "The fact is, it is virtually impossible to even conceive of a testing procedure to assess the health effects of genetically engineered foods."[36]

The credibility of industry's "it's the same" claim was dealt a further blow when a new analysis of Monsanto's genetically engineered Roundup Ready soybeans revealed that they contained more foreign DNA than previously thought.[37]

Several researchers reported in the journal *Nature* that the "it's the same" idea is not very scientific:

> The concept of substantial equivalence has never been properly defined.…It is

Box 1

Golden Rice and Vitamin A Deficiency

> *"The public relations uses of Golden Rice have gone too far."*
> —Gordon Conway, Rockefeller Foundation President, chief funder of Golden Rice

"Golden rice" is genetically engineered to produce beta-carotene, which the body can convert to Vitamin A. The new rice is heralded as a miracle cure for vitamin A deficiency (VAD), which afflicts millions of people in developing countries, especially children and pregnant women. But a closer look reveals a different picture.

The developers anticipate at least five more years will be required to breed the vitamin A trait into rice varieties adapted to local climates. Yet even if golden rice is successfully introduced, it will likely do little to ameliorate VAD because it produces so little beta-carotene. Three servings of ½ lb. cooked golden rice per day would provide only 10% of a woman's daily vitamin A requirement, and less than 6% if she were breast-feeding. And in order to absorb beta carotene, adequate zinc, protein and fats are also required. Those with diarrhea would also be unable to obtain vitamin A from golden rice.

Nutrition experts tells us that a balanced, diverse diet supplying a *full range* of foods and nutrients is the only sound way to promote health and prevent VAD and other nutritional deficiencies. A preschool child's daily requirement of vitamin A can be met with just two tablespoons of yellow sweet potatoes, half a cup of dark green leafy vegetables, or two-thirds of a medium-sized mango.

Even if golden rice is successfully developed, many question whether it is an efficient use of scarce public funds. There are innumerable small-scale projects throughout the developing world, such as the UN Food and Agriculture Organization's program in Bangladesh to help landless families develop home gardens with vitamin A-rich crops such as beans and pumpkins. Yet as biotechnology draws financial backing, such projects don't get the funding that they deserve.

Condensed from a fact sheet by Friends of the Earth, Earth Focus*, Spring 2001.*

exactly this vagueness which makes the concept useful to industry but unacceptable to the consumer.[38] [39]

"More widely tested than any other food"

The food biotech industry also boasts that, in the words of Monsanto's Chief Operating Officer, "These crops [and these] technologies have been more widely tested than any other food product that came before them in history."[40] This claims is based on the idea that genetically engineering plants is just a high-tech extension of centuries-old breeding techniques.

As scientific critics argue, however, in addition to the imprecision of gene insertion discussed above, genetic engineering is very different from traditional breeding techniques. This is because unlike conventional techniques genes from *any* plant, animal, bacterium, fungus or virus can be inserted into the DNA of *any* other organism. Also, again unlike conventional breeding, genetically engineered organisms can generally pass on their altered DNA through normal reproduction.[41] Thus unprecedented and unpredictable combinations can be made and the results can propagate irrevocably in the wild.

The "most tested in history" line is particularly disingenuous because FDA's presumption of substantial equivalence means that biotech companies are not required to do *any* pre-market safety testing on their crops. Regarding testing, FDA merely encourages (and may soon require) companies to notify and "consult" with the agency.[42]

The farmers' friend?

The big ag-biotech companies also ask us to believe that genetically engineered crops are great for the country's struggling farmers. DuPont, for example, describes biotech crops as "another tool for farmers to improve productivity and profitability."[43] It says, "Farmers all over the world will be able to take agricultural production to even higher levels of excellence."[44] Industry ads portray warm scenes of American farmers. (See ad this page.)

Yet the head of the American Corn Growers Association said that biotech crops "have become the albatross around the neck of farmers" on a wide range of farming issues.[45] Consider these problems[46]:

- Farmers growing for export (even conventional growers) are losing markets in countries wary of biotech crops. For example, in 1996, U.S. farmers sold $3 billion worth of corn and soybeans to Europe; by 1999, the figure was only $1 billion.[47]
- Studies on changes in yields, pesticide use and profit from planting biotech crops have shown mixed results that are not of great magnitude, whether up or down. The head of the National Family Farm Coalition said, "The promise was

Box 2

"We Paid $3 Billion For These Stations. We'll Decide What the News Is."

Steve Wilson and Jane Akre, an investigative reporting team at WTVT, Fox's Tampa Bay affiliate, thought they had a dynamite story: Despite promises to consumers, supermarkets in Florida were selling milk produced with rBGH, a genetically engineered growth hormone developed by Monsanto that boosts milk production.

The use of rBGH causes udder infections in cows, requiring increased use of antibiotics, but the monitoring of antibiotic residues in milk was inadequate, Akre and Wilson found. Most ominously, the Fox reporters found that some scientists believe that rBGH-boosted milk contains heightened levels of IGF-1, a hormone associated with increased risk of cancer (Science, 1/23/98).

Continued…

that you could use less chemicals and produce a greater yield. But let me tell you, none of this is true."[48]

- Should the industry's hopes of significantly higher yields come true, farmers could face disastrous decreases in already critically low commodity prices due to glutted supplies
- Biotech seeds are *leased*, not sold, and come with unprecedented restrictions on how they can be used. For example, farmers are generally not allowed to share, breed or save the seeds from the crops they grow.
- Farmers also face the possibility of crop contamination, uncertainty about liability and other serious issues

Public relations

Part of the reason the pesticide/ag-biotech giants are untrustworthy is that they generally market their products before there is adequate scientific research on their safety. For example, an internal 1988 chemical industry document from a committee with strong pesticide company representation acknowledged, "Very little data exists to broadly respond to the public's perception and the charges of our opponents."[49] Likewise, a recent letter to the prestigious journal *Science* reported that a detailed database search revealed just eight peer-reviewed journal articles dealing with *any* aspect of the safety of genetically engineered foods.[50]

Instead of scientific research, these companies have relied on public relations (PR) firms, "informational" organizations and internal PR departments. These PR agents poll opinion, develop strategy, engage the media, circulate ads, give speeches and publish articles, tapes and reports through a wide range of channels.

The crux of PR's usefulness to industry was made clear by one of its founders[51] in 1928: "It is now possible to control and regiment the masses according to our will without their knowing it."[52]

Bending reality

PR has done a lot for the pesticide/ag-biotech companies. For example, after the publication of *Silent Spring*, one PR agency published a parody of Carson's book in which insects take over the world.[53] A chemical association put out a brochure calling Carson's work "more poisonous than the pesticides she condemned."[54]

While ag-biotech PR spending today is difficult to determine, Monsanto alone attributed a $100 million increase in year 2000 expenses "primarily to increased spending on biotechnology acceptance and education programs,"[55] a clear reference to additional PR efforts.

Monsanto, DuPont, Novartis (now Syngenta), BASF, Dow, Aventis and other ag-biotech companies launched a $52 million PR campaign[56] directed by BSMG Worldwide, a major PR firm with clients such as Philip Morris.[57] BSMG specializes in services such as "Technology PR" and "Issues Advertising" and can "express an industry viewpoint" with "powerful, emotionally resonant messages."[58]

The *New York Times* uncovered efforts by a Monsanto PR firm, Burson-Marsteller, "to get groups of church members, union workers and the elderly to speak in favor of genetically engineered foods," including paying some members of a Baptist church for food and travel to an FDA meeting.[59]

The industry has also set up an organization called the Council for Biotechnology Information to pursue a

Box 2 (continued)

In trying to prevent their story from airing, Monsanto sent letters to Fox news saying "There is a lot at stake in what is going on in Florida, not only for Monsanto, but also for Fox News and its owner" and warning of "dire consequences for Fox News." A Fox attorney reportedly told Akre and Wilson, "I don't think this story is worth…spending a couple of hundred thousand dollars to fight Monsanto." The reporters say they were told by the station manager: "We paid $3 billion for these television stations….The news is what we tell you it is."

There story was postponed, and an endless round of revisions, cuts and conferences with lawyers took place. At one point the station offered to pay Wilson roughly $125,000, if he would just go away and never tell anyone how the story had been handled. The reporters were suspended several times and eventually fired. The station never aired any version of the story they had produced.

Condensed from a report in Fairness and Accuracy in Reporting, Extra! Update*, June 1998.*

"comprehensive communication campaign,"[60] with $250 million in resources to use over five years.[61]

In-house PR

Ag-biotech's internal PR efforts are also far reaching. To preempt unfavorable media coverage, for example, Monsanto repeatedly pressured Fox News, including threats of legal action, over a news segment about health risks from its recombinant (genetically engineered) Bovine Growth Hormone (rBGH). The segment's reporters were ultimately fired and the story never aired.[62] (See Box 2.)

Beyond false promises

Given the pesticide/ag-biotech companies' track record, any claim about the environment or health safety of their products merits deep skepticism. More important, behind each false promise are products that cause harm or pose serious risks to human health, farmers and the environment. Skepticism is vital, but so is taking action to stop these big agriculture corporations from causing widespread harm in the name of profit.

Opposition to genetically engineered crops and foods has been remarkably strong in parts of the world outside the United States. In just two years, for example, Europe progressed from almost no public awareness of GE foods to a *de facto* ban brought about by consumer rejection. Now opposition is building in the U.S., the heart of the biotechnology industry. Fortunately, there are many ways you can take part! (See below.)

Skip Spitzer is a genetic engineering campaigner at Pesticide Action Network North America.

September 2001

What you can do

Join the millions of people around the world opposing genetically engineered crops and foods. One effort is the **Genetically Engineered Food Alert campaign**, which is calling on food companies and regulatory agencies to keep GE foods off of store shelves unless:

1. They are proven safe for human health and the environment
2. They are labeled to safeguard the consumer's the right to know
3. Liability for any harm rests squarely with the biotechnology industry

To get involved in the Genetically Engineered Food Alert campaign, visit www.gefoodalert.org.

There are many other things you can do. For example:

- Join a local action group. If there is no group in your area, start one! (See www.purefood.org)
- Support legal action for stronger regulation. (See www.foodsafetynow.org)
- Buy local, organic foods and fibers. Avoid foods likely to contain genetically engineered ingredients. (See www.truefoodnow.org/shoppinglist.html)
- Learn more about genetic engineering (See www.panna.org/resources/geTutorial.html)

Pesticide Action Network North America *(PANNA) advocates adoption of ecologically sound practices in place of hazardous pesticides and genetically engineered crops. PANNA has over 100 affiliated groups in Canada, Mexico and the U.S., providing technical support and participating in joint projects with partner NGOs in Africa, Asia and the Americas. For more information visit www.panna.org.*

PANNA is a founding member of ***Genetically Engineered Food Alert,*** *a coalition of organizations concerned with consumers rights, public health and the environment. Genetically Engineered Food Alert has launched a nationwide campaign about the risks associated with genetically engineered foods. For more information visit www.gefoodalert.org.*

GOOD FOR FRUITS—Bigger apples, juicier fruits that are free from unsightly worms . . . all benefits resulting from DDT dusts and sprays.

Knox Out FOR THE HOME—helps to make healthier, more comfortable homes . . . protects your family from dangerous insect pests.

Knox Out FOR INDUSTRY—Food processing plants, laundries, dry cleaning plants, hotels . . . dozens of industries gain effective bug cleaning

More from the DDT ad: "Knox Out" DDT is good for fruits, the home, industry…

Endnotes

[1] Monsanto, "Food and Feed Safety," Biotech Knowledge Center, <http://www.biotechknowledge.com/showscience.php3?science_id=9>.
[2] RAFI Geno-Types, January 7, 2000, "AgBiotech's Five Jumbo Gene Giants."
[3] PANUPS, Top Seven Agrochemical Companies in 2000, May 23, 2001.
[4] Pesticide Action Network Updates Service (PANUPS), "World and U.S. Agrochemical Market in 1998," July 23, 1999
[5] One publication of this ad is believed to have occurred in *Time* during June 1954.
[6] Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin Co.), 1962.
[7] Jackie Giuliano, Healing Our World column, Environment News Service Web site, 1999, <http://ens.lycos.com/ens/sep99/1999L-09-07g.html> on 16 September 2001.
[8] Stephan Orme and Susan Kegley, PAN Pesticide Database, Pesticide Action Network North America, 2000, <http://www.pesticideinfo.org> on 23 September 2001.
[9] DDT Fact Sheet, U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry, September 1995, <http://www.atsdr.cdc.gov/2p-about-atsdr.html> on 25 September 2001.
[10] U.S. EPA, DDT, A Review of Scientific and Economic Aspects of the Decision To Ban Its Use as a Pesticide, report for the Committee on Appropriations of the U.S. House of Representatives, July 1975, EPA-540/1-75-022.
[11] DDT Fact Sheet, U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry, September 1995, <http://www.atsdr.cdc.gov/2p-about-atsdr.html> on 25 September 2001.
[12] Jackie Giuliano, Healing Our World column, Environment News Service Web site, 1999, <http://ens.lycos.com/ens/sep99/1999L-09-07g.html> on 16 September 2001.
[13] Stephan Orme and Susan Kegley, PAN Pesticide Database, Pesticide Action Network North America, 2000, <http://www.pesticideinfo.org> on 23 September 2001.
[14] Transcript of "Trade Secrets: A Moyers Rerport," Public Broadcasting Service, <http://www.pbs.org/tradesecrets/transcript.html>.
[15] Environmental Health Fund and Strategic Counsel on Corporate Accountability, "Beyond the Chemical Century," 3 December 1999, p.18.
[16] Transcript of "Trade Secrets: A Moyers Rerport," Public Broadcasting Service, <http://www.pbs.org/tradesecrets/transcript.html>.
[17] Circle of Poison: Impact of U.S. pesticides on Third World workers, Hearing before the Committee on Agriculture, Nutrition, and Forestry, U. S. Senate, 102nd Congress, first session, 5 June 1991.
[18] "Tap Water in Central Valley Tainted With Banned Pesticide," Environmental Working Group, 15 November 1999, <http://www.ewg.org/pub/home/reports/dbcp/dbcp.html> on 4 October 2001.
[19] Pesticide Action Network Updates Service (PANUPS), "Top Seven Agrochemical Companies in 2000," 23 May 2001.
[20] Jay Feldman, NCAMP/Beyond Pesticides, "Why Alternatives to Herbicides Should Be Used, on Earth Day and Everyday," *Boulder Weekly*, August 27, 1998.
[21] Herbicide Factsheet: Glyphosate (Roundup) Journal of Pesticide Reform. Fall 1998, updated October 2000.
[22] Pesticide Action Network Updates Service (PANUPS), "Monsanto Agrees to Change Ads and EPA Fines Northrup King," 10 January 1997.
[23] Rebecca Goldburg, Jane Rissler, Hope Shand, and Chuck Hassebrook, "Biotechnology's Bitter Harvest," Biotechnology Working Group, p.30.
[24] Jay Feldman, NCAMP/Beyond Pesticides, "Why Alternatives to Herbicides Should Be Used, on Earth Day and Everyday," *Boulder Weekly*, August 27, 1998.

[25] For more about the impacts of pesticide-based agriculture, see the Pesticide Action Network North America Web site at <http://www.panna.org>.
[26] J. Jeyaratnam, "Acute Pesticide Poisoning: A Major Global Health Problem," *World Health Statistics Quarterly*, 43(3): 139-144, 1990.
[27] For a detailed overview of the risks of transgenic crops, see Pesticide Action Network North America's online presentation, "Genetically engineered crops and foods," at <http://www.panna.org/panna/resources/geTutorial.html>.
[28] *The Observer* (UK), 2 August 1998.
[29] Skip Spitzer, "Riding the Bullet Train: The impact of GE crops on U.S. farmers," *Global Pesticide Campaigner*, December 2000.
[30] K. Watkins, "Free trade and farm fallacies," *Third World Resurgence*, 100/101, 1999, pp.33-37.
[31] USDA Food and Nutrition Service, "Household Food Security in the U.S. 1995-1998," USDA, July 1999.
[32] Steve Smith, head of Novartis Seeds, speaking at a Public Meeting in Tittleshall, Norfolk, on 29 March 2000, quoted in George Monbiot, "Organic Farming Will Feed the World," *Guardian* (UK), 24 August 2000.
[33] Monsanto Corporation, "Global Harvest: Biotechnology & Imported Food," Article No. 3727, 1 July 2000, <http://www.biotechknowledge.com/showlib.php3?uid=3727> on 4 October 2001.
[34] Food and Drug Administration. "Statement of Policy: Foods Derived From New Plant Varieties." *Federal Register*. Vol. 57, No. 104. 29 May 1992. 22984.
[35] Steven M. Druker, "Why FDA Policy on Genetically Engineered Food Violates Sound Science and U.S. Law," Presentation of the Alliance for Bio-Integrity at the FDA public meeting on genetically engineered foods, 30 November 1999 in Washington, D.C., available on the Alliance for Bio-Integrity Web site at <http://www.biointegrity.org/>.
[36] Alex Jack, *Imagine a World without Monarch Butterflies* (Becket, MA: One Peaceful World Press), 2000.
[37] James Meikle. "Soya gene find fuels doubts on GM crops." *The Guardian (London)*. 31 May 2000.
[38] E. Millstone, E. Brunner and S. Mayer, "Beyond 'substantial equivalence'," *Nature*, Vol. 401, No. 6743, 7 October 1999, pp.525-526.
[39] For more information on health risks see Pesticide Action Network North America's online presentation, "Genetically engineered crops and foods," at <http://www.panna.org/panna/resources/geTutorial.html>.
[40] Interview with Hugh Grant published on Frontline/Nova's "Harvest of Fear" Web site, <http://www.pbs.org/wgbh/harvest/interviews/grant.html>, accessed on 16 September 2001.
[41] For more on how gene insertion differs, see Michael Hansen and Ellen Hickey, "Genetic Engineering: Imprecise and Unpredictable," *Global Pesticide Campaigner*, Vol. 10, No. 1, April 2000.
[42] Richard Caplan and Skip Spitzer, "Regulation of Genetically Engineered Crops and Foods in the United States," Genetically Engineered Food Alert briefing paper, March 2001, available at <http://www.panna.org/resources/ge.html>.
[43] DuPont Web site, <http://www.dupont.com/biotech/difference/benefits.html>.
[44] William F. Kirk (Group Vice President, DuPont), "The 21st Century—An Agribusiness Odyssey," D.W. Brooks Lecture, University of Georgia College of Agricultural and Environmental Sciences, 2 October 2000.
[45] "Farmers Urged to Avoid Biotech Crops," Environment News Service, 27 August 1999.
[46] Skip Spitzer, "Riding the Bullet Train: The impact of GE crops on U.S. farmers," *Global Pesticide Campaigner*, December 2000.
[47] David Barboza, "In the Heartland, Genetic Promises," *New York Times*. March 17, 2000, pg. C1.
[48] Bill Christison, "Family Farmers Warn of the Dangers of Genetically Engineered Crops," *Synthesis/Regeneration*, 19 (Spring 1999).
[49] From an committee description attached to meeting notes of the Board Health Effects Committee of the Chemical Manufacturers Association, 24 January 1988, CMA 080711, in the Environmental Working Group Chemical Industry Archive, <http://www.chemicalindustryarchives.org/search/pdfs/cma/19871011_00000287.pdf>.
[50] Jose Domingo, "Health Risks of GM Foods: Many Opinions but Few Data," *Science*, 9 June 2000, 288: 1748-1749.
[51] Stuart Ewen, *Captains of Consciousness* (New York: McGraw-Hill), 1977, p.83.
[52] Edward Bernays, *Propaganda*, 1928, p.47.
[53] Bill Moyers "Trade Secrets: A Moyers Report" Web site (Public Broadcasting Service), <http://www.pbs.org/tradesecrets/evidence/secrecy_pop03.html>.
[54] Linda Lear, *Rachel Carson: Witness for Nature*, Henry Holt and Company, 1997.
[55] Monsanto Company, *2000 Annual Report*, p.22.
[56] Brett Chase, "Novartis Eliminates Gene-Altered Ingredients From Food Products," *Bloomberg*, 3 August 2000, 15:7.
[57] BSMG Web page, <http://www.bsmg.com/clients/client.htm> on 14 September 2001.
[58] BSMG Web pages, <http://www.bsmg.com/clients/serv.htm> and <http://www.bsmg.com/clients/Services/issues.htm> on 14 June 2000.
[59] Melody Petersen, "Monsanto Campaign Tries to Gain Support for Gene-Altered Food," *New York Times*, 8 December 1999, Section C, Page 1.
[60] Council for Biotechnology Information Web site, <http://www.whybiotech.com/en/whoarewe> accessed on 22 September 2001.
[61] "Biotech Rivals Team Up in Effort to Sell Altered Food," *St. Louis Post Dispatch*, 4 April 2000.
[62] Fairness and Accuracy in Reporting, *Extra! Update*, June 1998.