

GENE TECHNOLOGY INQUIRY

Introduction

"Gene technology will be the next great world wide revolution...." according to Fran Bailey, the Chairman of the Parliamentary Standing Committee on Primary Industries and Regional Services.

I can recall other great revolutions such as nuclear energy; the chemical revolution which has sparked so much pollution, and damaged the health of millions of people, and devastated the environment; DDT; PCB's; CFC's, prominent examples of "zero risk" chemicals. At least I presume they would have been "zero Risk" because surely, manufacturers wouldn't think more of profit than of producing really benign substances. Then we have the advent of pharmaceutical drugs and the great harm done to human health because of insufficient pre-market testing. Thalidomide and DES are two outstanding examples of the lack of knowledge of how the next generation(s) would be affected.

Gene technology is set to follow in those steps if it is not fully researched by bodies that do not have a financial interest in the results. There is a lot of information, and knowledge, in the minds of biotechnology company researchers, and those who are funded by the biotechnology companies, but very little wisdom. It is a case of let's get in first and make our money, leaving the community as a whole, to bear the burden that these inconsiderate individuals foist upon us.

Unfortunately, government and industry have the bit between their teeth and all reason is left behind.

When the committee considers the effect of genetic engineering it should not be forgotten that we live in an interdependent, holistic, environment. Other considerations, such as the health of consumers, and the effects on the rest of the environment, should also be part of the parliamentary inquiry

This submission was prepared with the intention of providing the committee with some of the dangers lurking in the background. Incidentally, you will note that the proponents see no obstacles in their way, they will have a 'fix' for everything that goes wrong, even if it happens to be too late. Nature is very unforgiving of those who dare to believe that they 'know' what makes it tick.

Antibiotic Resistance and Health Concerns

Public concern over antibiotic resistance has increased recently following a decision by EU governments to authorise a genetically modified strain of maize produced by Swiss drugs company Novartis. The crop carries an antibiotic resistance gene as a marker.

Groups opposed to gene crops have voiced fears that the use of the marker gene will lead to livestock or people who eat the crop becoming resistant to the penicillin class of antibiotics.

Austria and Luxembourg have slapped national bans on the maize but have been told by the EU's executive Commission that their action breaches EU law.
(BRUSSELS, Sept 10 (Reuters))

Dr Peter Wills, theoretical biologist at Auckland University writes:

"Genes encode proteins involved in the control of virtually all biological processes. By transferring genes across species barriers which have existed for eons between species like humans and sheep we risk breaching natural thresholds against unexpected biological processes. For example, an incorrectly folded form of an ordinary cellular protein can, under certain circumstances, be replicative and give rise to infectious neurological disease."

Professor Richard Lacey, microbiologist, medical doctor, and Professor of Food Safety at Leeds University has become one of the best-known figures of food science since his prediction of the BSE (mad cow disease) crisis, made more than seven years ago.

Recently Professor Lacey has spoken out strongly against the introduction of genetically engineered foods, because of "the essentially unlimited health risks." "The fact is, it is virtually impossible to even conceive of a testing procedure to assess the health effects of genetically engineered foods when introduced into the food chain, nor is there any valid nutritional or public interest reason for their introduction."

Dr Michael Antoniou, Senior Lecturer in Molecular Pathology at a London teaching hospital says,

"the generation of genetically engineered plants and animals involves the random integration of artificial combinations of genetic material from unrelated species into the DNA of the host organism. This procedure results in disruption of the genetic blueprint of the organism with totally unpredictable consequences. The unexpected production of toxic substances has now been observed in genetically engineered bacteria, yeast, plants, and animals with the problem remaining undetected until a major health hazard has arisen. Moreover, genetically engineered food or enzymatic food processing agents may produce an immediate effect or it could take years for full toxicity to come to light."

Because genetically engineered foods reproduce themselves and can never be recalled from the environment, Dr Antoniou warns of an unprecedented health risk for humanity.

Alive, July, 1998 article
Diseases Link to Gene Technology

A recent article in the journal *Microbial Ecology in Health and Disease* suggests links between commercial gene technology and the staggering rise of drug and antibiotic resistant infectious diseases. Because genetic engineering has created new vehicles (called vectors) for transferring genes across species boundaries, the article claims there is increased potential for creating and transferring new viral and bacterial pathogens, and spreading drug and antibiotic resistance.

The danger in genetic engineering is that industry has "convinced" government that the gene tinkered crops are substantially equivalent to normal crops. For that reason the crops are not tested extensively to insure that they are safe. One genetically engineered product, tryptophan, has been associated with at least seventy deaths and crippled thousands. At least one billion dollars has been paid in compensation for the disaster. (Presentation to: the Canadian Organic Advisory Board, AGM Canadian Organic Advisory Board, Agriculture, Food and Rural Affairs, Ontario Headquarters, Guelph, Ontario, Canada February 28, 1998 by Joe Cummins, PhD, Professor Emeritus of Genetics, University of Western Ontario)

TRANSGENIC PLANTS AND ANTIBIOTICS

by Patrice Courvalin, L'Institute Pasteur published in *La Recherche* 309 May 1998

The ampicillin resistance genes present in Novartis GE maize confers resistance against the penicillin class of antibiotics the most widely used in human therapy.

* punctual mutations on the antibiotic resistance gene present in the transgenic plant can provide further resistance against another and newer class of antibiotics, cephalosporine. These antibiotics are often used to substitute the older penicillin G antibiotics. This new class of antibiotics is very much used in hospitals to fight serious infections.

the opportunities to exchange genetic material among organisms in nature are immense and the reproduction of these conditions in lab and the field is difficult or even impossible.

* it is sure that the cultivation of transgenic crops containing antibiotic resistance gene with the multiplication of the number of the copies of the gene favour its evolution and dissemination.

the possibility of the transfer of DNA to soil bacteria through the decomposition of the plant gets facilitated by the fact that DNA is very stable in soil, and some bacteria may spontaneously and efficiently incorporate DNA. These micro-organisms, Acinetobacter, are part of the bacteria that are responsible for infection in immuno - depressed sick people who's number are increasing (people: with AIDS, having leukaemia, having had transplantation, having been treated with chemotherapy against cancer, being old)

* the ampicillin resistance gene in the Novartis transgenic plant is under the control of a bacterial promoter therefore, the gene gets immediately expressed (the responsible protein is built) when transferred to gram negative bacteria.

A recent summary of the methods used to induce a country to adopt a harmful genetically manipulated product is given below.

GENETICALLY ALTERING THE WORLD'S FOOD

On January 14, after an 8-year scientific review, Canada rejected Monsanto corporation's request for approval of its genetically altered milk hormone, rBGH, a drug that makes dairy cows produce 10% more milk than normal.¹ This was a serious setback for Monsanto because rBGH was the company's first genetically-engineered product and Monsanto had hoped international acceptance of rBGH would smooth the way for its other genetically-engineered farm crops like cotton, tomatoes, potatoes, rice, corn, and soybeans.

The approval process for rBGH in Canada became an embarrassing political fiasco when Canadian health officials claimed Monsanto had tried to bribe them, which the company denied, and government scientists testified that they were being pressured by higher-ups to approve rBGH against their better scientific judgment.

Ultimately, Canada gave a thumbs down to rBGH because, as the product label acknowledges, it can cause udder infections, painful, debilitating foot disorders, and reduced life span in treated cows.

U.S. Food and Drug Administration (FDA) approved the use of rBGH in U.S. dairy cows in November, 1993, without taking a position on the issue of cruelty to animals. Monsanto will not reveal how widely the drug has been adopted by U.S. dairy farmers.

Another report also opens up the problems for human consumers of this product:-

CHICAGO, March 21 /CNW/ -- The following was released today by Samuel S. Epstein, M.D., Professor Environmental Medicine, University of Illinois School of Public Health and Chairman of The Cancer Prevention Coalition:

The European Commission (EC) has just released a report by its authoritative international 16-member scientific committee, based on meticulous scientific documentation, confirming excess levels of the naturally occurring Insulin-like Growth Factor-1 (IGF-1) in milk of cows injected with

¹ Kelly Morris, "Bovine somatotropin--who's crying over spilt milk?" LANCET Vol. 353 (January 23, 1999), pg. 306.

Monsanto's biotech hormone (rBGH). The report concludes that the excess levels of IGF-1 pose serious risks of breast and prostate cancer.

"Experimental evidence for an association between IGF-1 and breast and prostate cancer is supported by epidemiological -- evidence arising from recently published cohort studies -- ."

The report also warns that excess levels of IGF-1 may promote the growth and invasiveness of any cancer by inhibiting programmed self-destruction of cancer cells (apoptosis), and that contamination of milk with residues of antibiotics used to treat mastitis in rBGH cows is likely to spread antibiotic resistant infections in the general population. The EC human health report finally emphasised the need for additional investigation of several other potential risks of rBGH milk.

A parallel EC report also warns of serious veterinary risks of rBGH. It may be noted that FDA has ignored such evidence reported in detail by the author in peer reviewed scientific publications over the last decade. The EC warnings are in sharp conflict with the policies of the Food and Drug Administration, largely based on unpublished and confidential Monsanto claims, that hormonal milk is safe.

Would our farmers be willing to inflict this on Australian consumers because it is "genetically engineered"? It should be noted that an application for the use of rBGH injections is being processed in new Zealand. Acceptance there will make it automatically available here, under the Free Trade Agreement.

Herbicides, Insect and Virus Resistance

Thurs., 01 Oct 1998 From: "NLP Wessex"

Below is an interesting press release issued by Novartis detailing their latest attempt to halt rapid build up of pest resistance to their Bt GM varieties of maize, which is an inevitable result of the technology being used (because the Bt toxin is embedded in every cell of every plant it means that there are permanent levels of pesticide in the crop throughout the growing season leading to rapid resistance mutation in target species).

In effect Novartis are now having to offer payments to farmers to adopt complex management programs hurriedly introduced in a desperate attempt to maintain the intended efficacy of their own technology.

No supply merchant offers payments or discounts to farmers unless he has to. This can only be an indication of the level of concern held by Novartis that this technology is in danger of becoming unsustainable very quickly.

A further indication of the futility of the embedded GM pesticide concept is the fact that Novartis are now recommending that up to 40% of the crop should be retained as non-GM in order to provide "refuges" for part of the pest population in order to reduce its susceptibility to rapidly develop resistance by over-exposure to the embedded pesticide.

What is particularly interesting is that Novartis state: "We didn't make an insect resistance management recommendation until the scientific community developed a research-based recommendation". This is a stark admission that the technology was introduced in the first place before proper research had been done. From Novartis' own admissions it is clear that the crops being grown are absolutely experimental. This is despite the biotechnology adverts in our newspapers claiming that these products have been subject to rigorous testing procedures regulated by numerous governments across the globe.

If the biotechnologists are unable to anticipate relatively simple interactions of these crops with lower animals such as insects, what hope is there that they are in a position to anticipate their interaction with more complex species such as the mammals (including us) who finally eat them? This after all is their ultimate purpose. Remember, we are not talking about pesticide residues here, we are talking about foreign genetic material which is embedded in every cell of every plant.

If Australian farmers accept GE as a worthwhile addition to their agricultural practices, and the refugia requirement is instituted, there will be a mixed GE/conventional seed crop. Consumer resistance to GE ingredients will harm farm sales to processors.

CROP GENE EXPERIMENTS 'COULD BREED SUPERWEEDS'

By John von Radowitz, PA News

Careless genetic tampering with crop plants to defend them against viruses raises a real risk of producing "superweeds", a scientist advising the government warned today. New research by Professor Alan Gray suggests that making plants resistant to viruses has a much bigger effect on their survivability than had previously been realised.

Viruses thought to live in peaceful harmony with their plant hosts could actually be killing them, said Professor Gray. If such plants were made immune to viral attack there was a danger of them turning into uncontrollable weeds. Professor Gray is a member of Acre, the Advisory Committee on Releases to the Environment, which guides government policy on genetically modified organisms. His team at the Institute of Terrestrial Ecology at Furzebrook research station, Wareham, Dorset, discovered a surprising range of viruses in wild cabbages. Young wild cabbages grown from seed were infected with two of these viruses and planted on a cliff in Dorset. One called turnip yellow mosaic virus increased the death rate of the cabbages, and both viruses reduced their reproductive performance.

Professor Gray said the findings challenged the view that plant populations were generally not greatly affected by viruses. This mistake may have arisen because whole populations have been wiped out by viruses and were therefore missed by scientists. Speaking at the British Association Festival of Science at Cardiff University, Professor Gray said: "The potential is there to end up with a superweed. We've had trials of virus-resistant plants in the UK." He said in the United States a virus-resistant squash had already been deregulated and released into the environment.

New Scientist August 15, 1998

How to handle a herbicide

BYLINE: Lila Guterman

A weed's resistance to the world's most widely used herbicide, glyphosate, may involve a previously unknown kind of defence against chemical attack. The discovery two years ago of a glyphosate-resistant strain of annual ryegrass was an unpleasant surprise for agrochemicals giant Monsanto, which markets glyphosate as Roundup (Supergrass sets alarm bells ringing, 6 July 1996, p 6). It was the first resistant plant in 20 years of glyphosate use. Stephen Powles, a biologist at the University of Western Australia in Perth, has been trying to work out why the ryegrass is resistant.

His team told the International Congress of Pesticide Chemistry in London last week that they have ruled out two common sources of resistance in plants: changes in the enzyme that the herbicide disables, and reduced uptake of the herbicide into the plant. They speculate that the movement of the herbicide into chloroplasts, which it targets, is somehow impeded. If so, it will be the first example of this type of resistance, Powles says.

Here is a referenced report on canola sent to Whole Foods Market Headquarters earlier this year -- compiled by Renu Namjoshi.

Canola can cross breed easily with other plants in the Brassica family such as wild turnip and wild radish. Two neighbouring fields of Canola can also cross breed easily. If one field is the genetically engineered variety and the other not, then the two crops may produce seeds for oil production that could contain the genetically engineered material. Research in Scotland has found the new genes 2.5km away from test sites (Timmons, A.M. et al 1996. Risks from transgenic crops. Nature Vol 380. p 487). Therefore it is highly likely that if planted on a large scale Canola will end up contaminated and consumers could never ensure that they were not consuming produce from genetically engineered Canola. Even organic Canola products could not be guaranteed.

The following is from FRANKFURTER RUNDSCHAU

Genetically manipulated plants can pass onto the environment their artificially changed genetic characteristics and as such threaten organic agriculture and conventionally working farmers. This is the result of year long studies done by the State Institute of Ecology for the Ministry of Environment of the Government of Niedersachsen (Germany) [Landesamt fuer Oekologie des niedersaechsischen Landesministeriums fuer Umwelt].

The study evaluated the effects of an open field experiment with genetically manipulated rapeseed in the area of Hanover since 1995. Even 200 metres from the experimental field manipulated genetic information was found in other plants of rapeseed. "These first results confirm our fears: once liberated into the environment, genes cannot be confined successfully", declared the Minister for Environment of the State of Niedersachsen, Sra. Monika Griefahn. Nobody can guarantee that in the neighbourhood of 'transgenic' fields, plants that can serve as crossing partners will not change as well. An eight meter wide "security zone" around the gene manipulated field could catch a major amount of the seeds, but nevertheless seeds escaped into the environment outside.

Mono-agriculture, the production of a few selected crops for mass production, itself is an artificial manipulation of nature. Along with the heavy spray of pesticide and herbicide it is abusive to the soil and threatens biodiversity. Planting bioengineered herbicide resistant crops, which is one of the main projects of genetic engineering will only allow farmers to spray higher level of herbicides without damaging crops. A vicious cycle will be created that will seriously contaminate our environment and poison animals.

Now or Never: Serious New Plans to Save a Natural Pest Control,

"Even though adequate resistance management plans have not been adopted, the EPA has rashly approved the planting of millions of acres of Bt crops," said Mellon. "EPA's actions have put Bt on a high trapeze before the nets have been installed." "If resistance occurs, organic farmers and others will lose one of their most valuable natural pest controls," said Dr. Jane Rissler, Senior Staff Scientist for UCS. "Deprived of the Bt crops, farmers would turn once again to multiple applications of synthetic chemical pesticides."

UCS is urging the EPA to make all plans mandatory. Under the recommended strategies, farmers would not be permitted to plant all their acreage in Bt crops, but would have to devote large areas (20 to 50 percent of total acreage) to non-Bt crops. The non-Bt crops would have to be planted close to the Bt crops in specified arrangements.

May 27, 1997, The Des Moines Register

Yet, scientists -- and farmers -- are beginning to ask: "Are weeds staging a comeback?" There are reports that more and more weed species have developed resistance to many herbicides. The Environmental Protection Agency last year stated that 270 weed species were reported to have developed pesticide resistance. This compared with 48 species identified as resistant in a 1986 National Academy of Sciences report.

"Weed resistance to herbicides has taken off," said Charles Benbrook, a Washington consultant who is a former official of the National Academy's Board on Agriculture. **Benbrook long has advanced non-chemical pest-control methods.** In its report 11 years ago, the academy warned that "literally hundreds of species of insects, plant pathogens, rodents and weeds have become resistant to chemical pesticides. Indeed, resistance to pesticides is a global phenomenon. It is growing in frequency and stands as a reminder of the resiliency of nature."

Douglas Buhler, research agronomist at the Agriculture Department's National Soil Tilth Laboratory in Ames, Iowa, agreed: "The key point is the resiliency of nature. We have thought that by using pesticides we could outfox nature. And we're not."

Robert Gordon Harvey, professor of agronomy at the University of Wisconsin, said, "We're seeing worldwide a greater number of instances of herbicide-resistant weeds."

Harvey said a major reason is the emphasis in recent decades on growing the same crop in the same fields year after year, referred to as "monoculture." **"As we've gone to monoculture, we've produced a very inefficient ecosystem.** If you have only corn in a field, nature says there's room for other plant species in that environment." Harvey said, "There are a lot of opportunities to manage weeds, but we have to be proactive." He advises farmers to have a five-year weed management plan that can include crop rotations, cultivation and a rigorous schedule both for application of chemicals and for the types of herbicides applied.

From Risks to Ecosystems by Michael F. Lane (Prepared for the Institute for Agriculture and Trade Policy, Minneapolis 13 Jan. 1997)

A real number of crop plants are being engineered for the capacity to persist in marginal environments and to propagate quickly. Both these traits confer to plants the potential to become noxious weeds, overrunning human and non-human ecosystems, displacing and killing plants and animals, upsetting the food chain, and permanently altering habitats. Furthermore, there is the risk that these "weedy" characteristics could be passed on to wild relatives of crop plants by gene "introgression": the flow of genes from one plant species to another, mainly through cross-pollination (Rissler and Mellon, 1996²). This could have devastating consequences, considering that some of the weeds most pernicious to agriculture worldwide are species of the oat, barley, potato, mustard, carrot, and sorghum genera (Juma, 1989³).

From Transgenic Transgression of Species Integrity and Species Boundaries - Mae-Wan Ho and Beatrix Tappeser.

Viral resistance transgenes can generate live viruses by recombination.

A major class of transgenic plants are now engineered for resistance to viral diseases by incorporating the gene for the virus' coat protein. Viruses are notoriously rapid in their mutation rate. They play a large role in horizontal gene transfer between bacteria (Reidl and Mekalanos, 1995; Ripp et al, 1994⁴) and also exchange genes among themselves thus increasing their host range (Sandmeier, 1994⁵). Molecular geneticists have expressed concerns that transgenic crops engineered to be resistant to viral diseases with genes for viral coat proteins might generate new diseases by several known processes. The first, transcapsidation - has been detected by Creamer and Falk (1990)⁶. It involves the DNA/RNA of one virus being wrapped up in the coat protein of another so that viral genes can get into cells which otherwise exclude them. The second, recombination, has

² The Ecological Risks of Engineered crops. Cambridge, MA, MIT Press

³ The Gene Hunters: Biotechnology and the Scramble for Seed. Princeton University press

⁴ Molecular Biology 18:685-701 and UTI. Molecular Ecology 3:121-126

⁵ Molecular Microbiology 12:343-350.

⁶ Journal Gen. Virology 71:211-217

been demonstrated in an experiment in which *Nicotiana benthamiana* plants expressing a segment of a cowpea chlorotic mottle virus (CCMV) gene was inoculated with a mutant CCMV missing that gene (Green and Allison, 1994⁷). The infectious virus was indeed regenerated by recombination. A third possibility is that the transgenic coat protein can help defective viruses multiply by complementation (Osbourn et al, 1990⁸). As plant cells are frequently infected with several viruses, recombination events will occur and new and virulent strains may be generated. Thus, the trans-boundary movement of the transgene will be disguised by recombination, and can only be traced with the appropriate molecular probes.

Miguel A. Altieri - Department of Environmental Science, Policy and Management University of California, Berkeley

The Environmental Risks of Transgenic Crops: an Agroecological Assessment

Ecological Impacts of Herbicides

Companies affirm that bromoxynil and glyphosate, when properly applied degrade rapidly in the soil, do not accumulate in ground water, have no effects on non-target organisms and leaves no residues in food. There is, however, evidence that bromoxynil causes birth defects in laboratory animals, is toxic to fish and may cause cancer in humans. Because bromoxynil is absorbed dermally, and because it causes birth defects in rodents, it is likely to pose hazards to farmers and farm workers. Similarly glyphosate has been reported to be toxic to some non-target species in the soil -both to beneficial predators such as spiders, mites, carabid and coccinellid beetles and to detritivores such as earthworms, as well as to aquatic organisms, including fish (Pimentel et al. 1989). As this herbicide is known to accumulate in fruits and tubers suffering little metabolic degradation in plants, questions about food safety also arise.

Reprinted with permission from the October 1998 issue of *Alive: Canadian Journal of Health and Nutrition*, 7436 Fraser Park Drive, Burnaby, BC V5J 5B9

Nettie Wiebe, from the National Farmers Union, illustrated that biotechnology can result in more use of toxic chemicals and damage the environment, counter to industry claims. Her neighbour had to spray with additional toxic chemicals to kill her herbicide resistant canola, following a hail storm. The hail had destroyed the crop and spread the seeds, effectively turning the biotech canola into herbicide resistant weeds!

Biotech advocates claimed that biotech crops are well researched before being approved. However, they admitted there are no standard procedures for assessing the environmental impact of genetically engineered crops. Many biotech products are deemed environmentally safe merely by observing that their non-biotech counterparts are safe.

Several speakers claimed that foreign genes do not interfere with other genes and cause unexpected problems. However, Dr. Clark referred to recent cases in Mississippi: Genetically engineered "Roundup Ready" cotton had produced malformed cotton bolls that fell off the plants, creating millions of dollars of damage. Farmers have also observed that biotech canola did not germinate normally.

Another problem is cross-pollination. Engineered genes move from biotech crops to wild relatives and pollute the gene pool. This could potentially wipe out indigenous species and causing unknown ecological effects. Crops genetically engineered to withstand insect pests have killed beneficial insects.

⁷ Science 263:1423

⁸ Virology 179:921-925

Dr. Clark pointed out that killing off one insect pest often results in the proliferation of other insect pests. This aggressive approach of killing off pests does not address the underlying ecological problem, and only creates further imbalance in the eco-system. She described successful organic, sustainable agriculture projects, countering the predominant view that biotechnology and chemical based agriculture are essential.

Wed, 20 Jan 1999 01:38:03 GMT

From: "Natural Law Party - Wessex"

Late last year a report was issued in the Canadian press of a GM herbicide resistant oilseed rape variety turning up on land in Alberta that had never grown it thanks to cross pollination from neighbouring crops.

This resulted in the farmer concerned being unable to kill rape volunteers after harvest despite using TWO applications of glyphosphate, as the volunteers were resistant to it.

The UK's Farmers Weekly has now run a full story on this (p52 15 January 1999).

"Just because you're not growing herbicide-resistant canola (oilseed rape), it does not mean you can't get herbicide-resistant volunteers," says Phil Thomas, Alberta Agriculture's provincial oilseed specialist. "It may be a bit of a headache to know what your neighbour grows and to plan your strategy accordingly," he adds.

"Monsanto never made farmers aware of the possibility of this happening when we signed the TUA (Technical Use Agreement)," says affected farmer Tony Huether who has been growing the herbicide resistant rape elsewhere on the farm. "It's not that easy a problem to solve when direct seeding and planting a wide range of crops."

According to the Farmers Weekly article Mr Heuther and Mr Thomas say the addition of any broadleaf herbicides, such as 2,4-D can control unexpected GM herbicide tolerant volunteers, but Mr Huether worries about the effects of 2,4-D residues on broad leaved crops and loathes handling the more toxic chemical. Farmers are not getting all the facts they need on GM crops, he fears.

* The mid-January 1999 issue of the California Farmer magazine reports that Bt resistance has emerged among pink bollworms, a major cotton pest, in Arizona cotton fields. Biotech critics have warned for years that genetically engineered Bt crops will cause major crop pests to develop resistance to Bt, thereby destroying the usefulness of the world's most important natural biopesticide.

14 of the world's scientists, who are well-known as very knowledgeable in the realm of biotechnology recently issued a set of statements regarding their concerns. Three of those statements are:-

"Herbicide resistant transgenes have spread to wild relatives by cross-pollination in both oilseed rape and sugar beet,⁹ creating many species of potential superweeds. One study shows that transgenes may be up to 30 times more likely to escape than the plant's own genes."¹⁰

"Bt-toxins engineered into a wide range of transgenic plants already released into the environment may build up in the soil and have devastating impacts on pollinators and other beneficial insects."¹¹

⁹ Brookes, M. (1998). Running wild, *New Scientist* 31 October; Snow, A. and Jorgensen, R. (1998). Costs of transgenic glufosinate resistance introgressed from *Brassica napus* into weedy *Brassica rapa*. Abstract, Ecological Society of America, Baltimore, Aug. 6, 1998.

¹⁰ Bergelson, J., Purrington, c.B. and Wichmann, G. (1998). Promiscuity in transgenic plants. *Nature* 395, 25.

" Herbicide resistant transgenic plants may lead to increased use of herbicides, contrary to what is being claimed. The transgenic plants themselves are already turning up as volunteer plants after the harvest, and have to be controlled by additional sprays of other herbicides.¹² The use of glyphosate with genetically engineered resistant plants will encourage the evolution of glyphosate resistance in weeds and other species, even without cross-pollination. A ryegrass highly resistant to glyphosate has already been found in Australia.¹³ Resistance evolves extremely rapidly because all cells have the capability of mutating their genes at high rates to resistance if they are exposed continuously to sub-lethal levels of toxic substances including herbicides, pesticides and antibiotics. This is inherent to the "fluidity" of genes and genomes that has been documented within the past 20 years.¹⁴ It will render resistant plants useless after several generations, as the herbicide is widely applied. At the same time, resistant weeds and pathogens may become increasingly abundant. Additional herbicides will then have to be used to control the resistant weeds."

Below is a report of contact herbicide released by Zeneca in Canada earlier this year. It is particularly interesting to see Zeneca marketing this product as an effective way of controlling GM crop volunteers which have been genetically modified to be resistant to Roundup and are therefore no longer controllable using glyphosate.

It is significant that this represents a formal acknowledgment by a biotechnology company that GM herbicide resistance has now become a serious agronomic problem for farmers. **It is also a defacto admission that the introduction of GM herbicide resistant crops will necessitate the use of a wider range of chemical types in agriculture.**

The need to use additional chemical types in order to control volunteers from harvested crops of its own glufosinate-ammonium tolerant "Liberty Link" varieties has also previously been acknowledged by Pierre-Louis Dupont, AgrEvo's European head of marketing -: "However, in the case of Liberty Link products, farmers will be using a chemical which is not currently used for volunteer control."(Farmers Weekly 13th March 1998).

Roundup

Monsanto has long held that Roundup is virtually harmless to the environment. The following information is but a fraction of that which could have been inserted. One factor to be noted, when reading the following, is the required 200-fold increase in the amount of Roundup residue in dried soybeans.

URGENT APPEAL TO ALL GOVERNMENTS TO REVOKE THE MARKET APPROVAL OF MONSANTO'S RR-SOYBEAN

We the undersigned scientists ask all governments to use whatever methods are available to them to bar from their markets on grounds of injury to public health Monsanto's genetically engineered Roundup Ready (RR) soybeans. In the case of the European Union, of course, we urge the individual governments to invoke Article 16 (Directive 90/220). We make this appeal on the following bases:

¹¹ Crecchio, C. and Stotzky, G. (1998). Insecticidal activity and biodegradation of the toxin from *B. acillus thuringiensis* subsp. *Kurstaki* bound to humic, acids from soil, "Soil Biology and Biochemistry 30", 463-70, and references therein.

¹² See "Disappointing Biotech Crops" <<http://www.btinternet.com/%7Enlpwessex>www.btinternet.com/~nlpwessex>>.

¹³ New Scientist, 6 July, 1996.

¹⁴ See Dover, G.A. and Flavell, R.B. (1982). *Genome Evolution*, Academic Press; also Ho, M.W. 1998, 1999. *Genetic Engineering Dream or Nightmare? The Brave New World of Bad Science and Big Business*, Gateways Books and Third World Network, Bath and Penang.

1) There is clear scientific evidence that application of glyphosate can increase the level of plant estrogens. This has been shown for the bean *Vicia faba* by German researchers (Sandermann and Wellmann, 1988, in Biosafety, p. 285-292, ed: German Ministry of Research and Technology). Soya belongs to the same plant family (legumes) as these beans.

2) Plant estrogens are known to affect mammals including humans.

3) Feeding experiments were done on cows with transgenic and ordinary soybeans by Monsanto. A statistically significant difference in the daily milk fat production between the test groups was found. Those fed transgenic RR-soybeans produced more fat per day than those fed ordinary soya. All test groups had the same intake of soya per day (Hammond et al., Journal of Nutrition, 1996). We conclude that this is an indication of a substantial difference between the transgenic and the non-transgenic soybean.

4). Monsanto's application for market approval provided no data on oestrogen levels of RR-soybeans sprayed with glyphosate. All data provided on the concentration level of different compounds in RR-soybeans was derived from unsprayed beans. Despite the lack of information on sprayed beans, RR-soybeans were approved. And sprayed beans have since entered the food chain.

We are concerned that the increased milk fat production by cows fed RR-soybeans may be a direct consequence of higher oestrogen levels in those soybeans. Growing numbers of children are dependent on soy-milk due to allergic reactions to cow's milk. Young children are especially susceptible to elevated levels of oestrogen. Thus there is a clear and serious health issue at hand.

There is urgent need for further and independent scientific investigation. In adherence to the precautionary principle, until these investigations are completed, RR-soybeans should no longer be allowed to enter the food chain.

Dr. Brian Goodwin, UK Dr. Mae Wan Ho, UK Dr. Hartmut Meyer, Germany Dr. Peter Saunders, UK Dr. Vandana Shiva, India Dr. Ricarda Steinbrecher, UK Dr. Beatrix Tappeser, Germany Christine von Weizsacker, Germany

Montréal, 13 October 1997 Third Meeting of the Open-ended Ad hoc Working Group on Biosafety of the UN-Convention on Biological Diversity

References:

1) H. Sandermann, E. Wellmann, 1988, Bundesministerium fuer Forschung und Technologie (Hrsg.), Biologische Sicherheit 1, Pages 285-292

2) H. Sandermann (1994, in: W. van den Daele, A. Puehler, H. Sukopp (Hrsg.), Verfahren zur Technikfolgenabschaetzung des Anbaus von Kulturpflanzen mit gentechnisch erzeugter Herbizidresistenz, Issue 6, Part A

From: A study by Caroline Cox

However the survival of earthworms under this system has to be questioned in the long run. There is a paper from Caroline Cox of Pesticides Action Network on glyphosate which denies many of Monsanto's environmental claims for glyphosate, including its biodegradability. In relation to earthworms, the study says:

"A study of the most common earthworm found in agricultural soils in New Zealand showed that glyphosate significantly affects growth and survival of earthworms. Repeated biweekly applications

of low rates of glyphosate (1/20 of typical rates) caused a reduction in growth, an increase in the time to maturity, and an increase in mortality." [Springett, J.A. and R.A.J. Gray. 1992. Effect of repeated low doses of biocides on the earthworm *Aporrectodea caliginosa* in laboratory culture. *Soil Biol. Biochem.* 24(12):1739-1744.]

From: Genetically Engineered Soya; Contaminating the Great Treasure
by Marc Lappe and Britt Bailey

Toxic Concerns:

A logical concern of Roundup ready technology is that its widespread use will go hand and glove with a dramatic increase in Roundup herbicide usage. In spite of its reputation as a "safe" herbicide, we have concerns over this vast expansion of reliance on Roundup. While Roundup's major ingredient, glyphosate, has a toxicity of its own, toxicity from other components add another dimension to the debate. Roundup itself is typically 41% glyphosate. The remaining 59% consists of inert ingredients. These "inert" ingredients are inactive only with regard to their toxicity to pests. Inerts like polyethoxylated tallow amine (POEA) have toxicity of their own in their functions as detergents or surfactants whose purpose is to ease the application of the herbicide. Surfactants de-clog applicators and evenly spread the herbicide over the plant.

POEA is a notable inert ingredient in Roundup. POEA was cited as the cause of toxicity in nine Japanese human deaths after ingestion of Roundup. In Taiwan, deaths have been reported in some 11 of 97 persons who have intentionally ingested large amounts of glyphosate and POEA. While such doses (measured in the hundreds of millilitres) are not likely to be encountered in everyday usage, they confirm the toxicity of glyphosate surfactant herbicide formulations.

In 1992, Monsanto scientists finalised the lengthy development of a gene technology that makes plants resistant to Roundup®. The new gene increases enzymes within the plant that otherwise would be inhibited by the herbicide. The enzyme (EPSPS), or protein that controls the aromatic amino acid biosynthesis in plants. When the levels of EPSP are increased, the plants become significantly more tolerant to glyphosate. Given the reality of the availability of transgenic soy crops, and their wide acceptance, it is likely that ingestion of engineered soybeans will increase. The coming market saturation of bioengineered soybeans not only raises questions about the effects of soy in the human diet, but also requires a discussion of the possible toxicity of additional gene products that humans are now ingesting .

J.Fagan OnRoundup

Roundup is touted by Monsanto as short-lived in the environment and harmless to living things. However, there is evidence in the scientific literature that calls both of these claims into question. Significant residues of Roundup have been detected in soil long after application. for instance, one study revealed residues as long as 3 years after application of Roundup (Torstensson, NTL, et al. *Ecotoxicol. Environ. Safety* 18:230;1989). Thus this chemical can persist in the soil and be taken up by subsequent crops. Recent observations in several studies indicate that Roundup is also harmful to fish (WHO UN Environmental Program, International Labour Organization.1994. *Glyphosate. Environmental Health Criteria # I 59.* Geneva, Switzerland), earthworms (*Soil Biol. Biochem.* 24:17p9;199?), and beneficial insects (*Pestic. Sci.* 30:309;1990).

Direct evidence that Roundup is harmful to human health is also growing. For instance, research done in California has found that Roundup exposure is the third most frequent cause of toxic reactions in farm workers (Pease, W.S. et al,1993, *Preventing pesticide-related illness in California agriculture: Strategies and priorities.* Environmental Health Policy Program Report. Berkeley, CA: University of California School of Public health, California Policy Seminar).

Effects on reproductive function in small mammals also suggest that Roundup may have harmful effects on reproductive function in humans. In rat feeding studies, Roundup reduced sperm counts and lengthened the estrous cycle (US Dept. Health & Human Services. Public Health Service. National Institutes of Health. NTP technical report on toxicity studies of glyphosate (CAS No. 1071-83-6) administered in dosed feed to F344/N rats and B6C3F mice. (NIH Publication 92-3135), and Toxicity Reports Series No.16. Research Triangle Park, NC: National Toxicology Program).

Other reproductive and developmental problems were also observed in rats (WHO UN Environmental Program, International Labour Organisation. 1994. Glyphosate. Environmental Health Criteria #159. Geneva, Switzerland). Some multiple generation studies have also resulted in adverse effects on foetal development (US EPA Office of Pesticide Programs. Special Review and Re-registration Division, 1993. Re-registration Eligibility Decision (RED) Glyphosate. Washington D.C. (September, 1993)

Yields and Dollar returns

COLUMBIA, Mo. (AP) -- A soil-borne fungus is threatening soybean crops in parts of central and northern Missouri, a problem some farm experts are linking to a sought-after genetically altered soybean.

The state's worst-ever outbreak of Sudden Death Syndrome is afflicting soybean crops and could affect production levels, officials said.

“It's showing up much earlier, and that's when you get severe yield loss,” said George Smith, director of the University of Missouri's Integrated Pest Management Program. “For some guys the yield impacts will not be pleasant.”

Heavy rains during the spring and summer fed the syndrome, known scientifically as *Fusarium solani*.

But another factor in the outbreak was the enormous demand for genetically-altered soybeans that are resistant to Monsanto's Roundup herbicide, agriculturists say.

Though Roundup-resistant beans aren't necessarily more susceptible to Sudden Death Syndrome than other beans, high demand for them meant farmers weren't as careful in choosing varieties that were disease-resistant.

Brad Stubbs, a Columbia soybean farmer, said he could face a 50 percent yield reduction in some of his fields.

“In a rush to get these genetically-altered soybeans out, I think there was a rush to get some variations on the market that didn't really have good disease resistance,” Stubbs said.

LETTER To THE TIMES
September 4 1998

Monsanto claims that transgenic crops produce higher yields. However, data from sources other than Monsanto, such as Cyanamid (with whom Monsanto is about to merge) and Canadian seed assessment authorities, indicate that some of Monsanto's herbicide-resistant crops are producing lower yields and profits for farmers than unmodified varieties.

These sources also suggest that some GM soya and oilseed products from Monsanto are producing yield losses of up to 20 per cent compared to unmodified varieties, despite the crops being herbicide-resistant. Greenpeace announced last week that farmers in parts of the former Soviet

Union growing Monsanto's GM "Naturemark" NewLeaf potatoes have been producing yields at half to one third the expected levels. Farmers in Georgia have been pushed into debt as a result.

The poor agronomic performance of these GM products would seem to indicate that biotechnologists may not have control over the knock-on effects of randomly introducing foreign genetic material into crops. Clearly other aspects of plant functioning are being unexpectedly affected. Let the buyer beware.

Sincerely,
MARK GRIFFITHS
(Environment spokesman,
Natural Law Party),

The Gene Exchange Summer 1998

The Council ruling was the culmination of a state-mandated process that farmers must go through before they can sue companies for putative losses due to defective products. Last fall, 54 cotton growers filed for arbitration with the Council over failure of the new cotton. Soon thereafter, Monsanto began settling with farmers--reportedly paying out millions of dollars in Mississippi and neighbouring states. However, three growers refused the company's offers and argued for higher compensation in a May hearing before the Arbitration Council. The board issued its nonbinding decision on June 12, giving farmers and the companies 30 days to decide whether to accept the recommended settlement.

Scientists are not yet certain why Roundup Ready cotton failed in so many Mississippi Delta fields. Monsanto is speculating that the cool, wet spring weather in the Delta slowed cotton growth--and the breakdown of glyphosate which is necessary to avoid its toxic effects. Spraying every 10 days, as the herbicide label allowed, probably meant that the engineered cotton was exposed to more glyphosate than it could effectively degrade. The company has since changed the label to caution growers to allow a certain amount of growth between sprays.

GM Oilseed rape results reveal poor performance

The Natural Law Party is advising farmers in Dorset that they should avoid growing genetically modified oilseed rape next year, in the event that government consent for the crop is granted. The Natural Law Party has discovered results of trials in Canada showing genetically modified (GM) varieties are being out-performed by conventional non-modified varieties, despite being approved for official seed registration lists.

Information obtained by the Natural Law Party confirms that GM oilseed rape has not been scoring high enough points in standard performance tests to get onto officially approved seed lists in Canada. In order to overcome this problem the approval committee concerned has had to change the scoring system, and has only succeeded in getting approval for GM rape varieties by awarding special bonus points which do not relate to crop output.

Farmers misled

The Natural Law Party has criticised the Canadian authorities for altering the rules in order to artificially promote GM products when they are agronomically inferior to non-modified varieties, particularly when farmers rely on the official listings for guidance on which crops to grow. Harvested GM oilseed rape in Canada is showing **falls in yields of up to 21%** compared to traditional varieties. GM varieties lose farmers money

Earlier this year a director of the Ontario Canola (Rape) Growers Association revealed that yields on his farm from Monsanto's Round Up Ready rape seed had fallen to 2.2t/ha compared with a 2.6 - 2.8/ha average for traditional varieties, with no savings in net costs.

"The actual performance of these crops exposes the misleading and entirely subjective basis on which the seed approval system for GM rape has itself been modified. Farmers are being hit by this misinformation directly where it hurts most - in their pockets," adds Mr Griffiths.

Pesticide Action Network North America
April 24, 1998

Disappointing Biotech Crops

One of the selling points for many genetically engineered crops has been that farmers will need fewer inputs and therefore have higher returns per acre. However, two recently released studies indicate that this may not necessarily be the case.

Researchers at the University of Arkansas recently found that net income from land planted with Bt cotton was less than land planted with conventional cotton by an average of \$25 per acre in 1997, based on observations in three Arkansas counties. (Bt cotton is genetically engineered to produce its own pest-killing toxin. Currently, Monsanto dominates the engineered-cotton market). To carry out the study, researchers compared fields planted with Bt cotton to similar fields within the same farms that were planted with conventional cotton.

Previously, researchers had found that Bt cotton performed well in Arkansas in 1996, and economic studies from the Delta and Southeastern states showed a substantial increase in net income per acre planted with Bt cotton that year. However, at least in Arkansas, 1997 did not appear to be as profitable. In the University of Arkansas study, Bt cotton showed less profit per acre than non-Bt cotton in four of seven observations, and on the average yielded 24 pounds per acre less than non-Bt cotton.

From: Eco-Consumer (Brisbane) February, 1998

Bt Cotton fails again - Farmers on Queensland's Darling Downs, who were disappointed with having to spray their GE Ingard cotton crops more than expected in the first season, are now having to use even more chemical spraying to salvage their second season of Ingard plantings. Many are seeking repayment from Monsanto of the \$245 per ha licence fee, while others are talking about getting out of cotton growing altogether because of their inability to control the *Heliothis* caterpillar pests. (Qld Country Life, 22/1/98)

In the United States there are recent reports among agronomists of problems with Monsanto's "Roundup Ready" Cotton in Mississippi, North Carolina, Oklahoma, Texas, and Arizona. In addition informed sources in Arizona report that Bt cotton is failing to repel pink bollworms, a major cotton pest. Lagging sales of Monsanto's Bt corn seeds in the Midwest have already forced the company to slash prices by 30%.

Augusta Chronicle; 01/25/99

"Andrew Thompson said he felt like a failure when nearly a quarter of his cotton crop withered in the field last year, costing him about \$250,000.

"When you have strangers riding up and down the highway and see this sorry crop, they say, 'This is a sorry farmer,' " said the Brooks County grower. "It's straining emotionally."

Now Mr. Thompson says the problem was the seed he used on 350 of his 1,600 acres. He is among about 190 farmers in Georgia, Florida and North Carolina who have hired attorneys to represent them in a legal dispute with "Monsanto" Co. and Delta Pine and Land Co.

Mr. Thompson's suit, filed in Superior Court in Quitman, contends the companies rushed the seed to market without adequate testing and, when they began receiving complaints in 1997, misled growers and agriculture officials about the extent of the problem.

Steve Brown, a University of Georgia cotton specialist, said university researchers tested the Paymaster 1220 seed in 1997, noticed problems such as deformed roots and warned growers not to use it."

Biodiversity & Monoculture

Large scale agriculture, and large scale production of seeds for sale, have something in common. They are best suited by using monoculture, the planting of vast areas of land with the same variety, and preferably on a basis of repeated planting's over a number of years.

Biodiversity, on the other hand, relies on a large number of different varieties more suited to the particular soil, and climate, of the region in which they are grown. In this continual breeding cycle, farmers, particularly the subsistence farmers in less well-developed countries, also introduce desirable characteristics from wild members of the species being bred.

Monoculture provides an open invitation to pests, viruses, fungi, etc., to take advantage of the opportunity to wreak havoc on such a tempting array of food. This temptation has to be protected by various heroic means because natural defences have been dispensed with.

GENETIC TRESPASSING AND ENVIRONMENTAL ETHICS by Dr. Mira Fong

Mono-agriculture, the production of a few selected crops for mass production, itself is an artificial manipulation of nature. Along with the heavy spray of pesticide and herbicide it is abusive to the soil and threatens biodiversity. Planting bioengineered herbicide resistant crops, which is one of the main projects of genetic engineering will only allow farmers to spray higher level of herbicides without damaging crops. A vicious cycle will be created that will seriously contaminate our environment and poison animals.

Another danger is that biotechnology promises us a new variety of disease resistant crops. Transgenic crops contain genes from viruses, bacteria, animals and other plants. For example, transgenic tomatoes and strawberries contain the antifreeze gene from Arctic fish so they are better frost resistant. Such bizarre, surreal combinations not only can disrupt the host genetic functions but also can cause confused, chaotic biochemical mutations in the plants.

13 December 1998

Front Page - UK Independent on Sunday

Revealed: risks of genetic food

By Marie Woolf, Political Correspondent

A KEY government report on the effects of growing genetically modified crops has been **suppressed** because of its controversial warning of serious environmental risks. It says there are serious dangers to Britain's hedgerows, birds and indigenous plants from growing GM crops on a commercial scale.

The report, commissioned by ministers to assess the potential effects of cultivating GM food in Britain, concludes that there are insufficient safeguards to stop the creation of hybrid multi-resistant plants.

It lists a series of "gaps" in the UK's regulatory framework, leaving Britain's wildlife at serious risk of damage from genetically modified plants and other intensive farming methods.

The news comes as the Health and Safety Executive, responsible for monitoring GM crop trials, has revealed that in the six months between April and October this year more than one in 10 of the 49 sites inspected during that period had been breaking the regulations governing trials. This week it is expected to prosecute Monsanto for such breaches - the first ever criminal case of its kind.

The study, written by civil servants after widespread consultation with government advisers, also warns that the commercial growth of GM crops could lead to more pesticides being sprayed on Britain's fields. (end of extract)

Marc Lappe & Britt Bailey in their book "Against the Grain" make the following comments:-

"According to Dow Chemical scientists who are marketing their own line of Bt-containing crops, within 10 years Bt will have lost its usefulness because so many insects will have developed resistance to its toxin.[1,pg.70] Thus Monsanto and Dow are profiting bountifully in the short term, while destroying the usefulness of the one natural pesticide that undergirds the low-pesticide approach of IPM and organic farming. It is another brilliant -- if utterly ruthless and antisocial -- Monsanto business plan.

Ultimately, for sustainability and long-term maximum yield, agricultural ecosystems must become diversified once again. This is the key idea underlying organic farming. Monoculture cropping -- growing acre upon acre of the same crop -- is the antithesis of sustainability because monocultures are fragile and unstable, subject to insect swarms, drought, and blight. Monocultures can only be sustained by intensive, expensive inputs of water, energy, chemicals, and machinery. Slowly over the past two decades, the movement toward IPM and organic farming has begun to take hold in this country -- despite opposition from the federal government, from the chemical companies, from the banks that make farm loans, and from the corporations that sell insurance. Now comes the genetic engineering revolution, which is dragging U.S. agriculture back down the old path toward vast monocultures, heavy reliance on machinery, energy, water, and chemicals, all of which favours the huge farm over the small family operation. It is precisely the wrong direction to be taking agricultural technology in the late 20th century, if the goals are long-term maximum yield, food security, and sustainability.

- How a gene affects a plant depends upon the environment. The same gene can have different effects, depending on the environment in which the new plant is growing.¹⁵ What appears predictable and safe after a few years of observation of a small test plot may turn out to have quite different consequences when introduced into millions of acres of croplands in the U.S. and elsewhere, where conditions vary widely.
- Does the new gene destabilise the entire plant genome in some unforeseen way, leading one day to problems in that crop? Only time will tell."

The 14 scientists referred to elsewhere also had this to say about biodiversity:-

¹⁵ Craig Holdrege, GENETICS AND THE MANIPULATION OF LIFE: THE FORGOTTEN FACTOR OF CONTEXT (Hudson, N.Y.: Lindisfarne Press, 1996)

"Broad-spectrum herbicides will have major impacts on biodiversity.¹⁶ They kill all other plants indiscriminately. This will destroy wild plants as well as insects, birds, mammals and other animals that depend on the plants for food and shelter. In addition, Roundup (Monsanto's formulation of glyphosate) can be highly toxic to fish. Glyphosate also harms earthworms and many beneficial mycorrhizal fungi and other microorganisms that are involved in nutrient recycling in the soil. It is so generally toxic that researchers are even investigating its potential as an antimicrobial.¹⁷

Herbicide resistant transgenic crops are incompatible with sustainable agriculture. Many studies within the past 10 to 15 years have shown that sustainable organic agriculture can improve yields and regenerate agricultural land degraded by the intensive agriculture of the green revolution.¹⁸ Sustainable organic agriculture depends on maintaining natural soil fertility as well as on mixed cropping and crop rotation. This has been reversing the destructive effects of intensive agriculture that have led to falling productivity since that 1980s. Glyphosate resistant plants requires application of glyphosate which not only kills other species of plants but harms mycorrhizal fungi symbiotically associated with the roots of plants, which are now found to be crucial for maintaining both species diversity and productivity of ecosystems.¹⁹ The depletion of mycorrhizal fungi in intensive agriculture could therefore decrease both plant biodiversity and ecosystem productivity, while increasing ecosystem instability. "The present reduction in biodiversity on Earth and its potential threat to ecosystem stability and sustainability can only be reversed or stopped if whole ecosystems, including ecosystem components other than plants are protected and conserved."²⁰

Rogue genes cross to weeds
By Marie Woolf

Independent on Sunday 18th April

Scientists have discovered the first genetically modified superweeds in Britain, following the spread of pollen from a GM trial crop to wild turnip plants. The hybrids were produced after plants in a field of wild turnip crossed with a nearby test-site of genetically engineered oilseed rape. Some of the "Frankenstein" plants, which had inherited their GM parent's herbicide resistance genes, were able to breed. The discovery has been seized on by environmentalists as "groundbreaking" because it proves for the first time that GM crops can pass on their engineered traits to indigenous British species growing nearby.

"This is the first field evidence of the spread of weedkiller-resistant genes to wild relatives," said Pete Riley, food and biotechnology campaigner for Friends of the Earth. "The Government should act quickly as the French have done to ban the planting of crops with wild relatives to prevent cross-breeding." The find was made by the scientists employed by the Government to monitor GM test crops at a field-scale trial site in Cambridgeshire. The scientists from the National Institute of Agricultural Botany found that although the parent plants were indigenous wild turnips, the smaller plants looks more like "hairy oilseed rape plants". Seeds from the plants produced turnip-GM-rape hybrids, some of which, when sprayed by the scientists, proved to be resistant to weedkiller. Some of the hybrid plants were sterile, but about half were able to breed and pass on their GM traits. The

¹⁶ See Greenpeace Report, 1998, and references therein.

¹⁷ . Roberts, F., Roberts, C.W., Johson, J.J., Kyle, D.E., Drell, T., Coggins, J.R., Coombs, G.H., Milhous, W.K., Tzipori, S., Ferguson, D.J.P., Chakrabarti, D. and McLeod, R. (1998). Evidence for the shikimate pathway in apicomplexan parasites. *Nature* 393, 801-5.

¹⁸ See Pretty, J. (1995). *Regenerating Agriculture: Policies and Practice for Sustainability and Self-Reliance*, Earthscan, London; also Ho (1998,1999), note 11.

¹⁹ van der Heijden, M.G.A., Klironomos, J.N., Ursic, M., Moutoglis, P., Streitwolf-Engel, R., Boller, T., Wiemken, A. and Sanders I.R. (1998). Mycorrhizal fungal diversity determines plant variability and productivity. *Nature* 396, 69-72.

²⁰ van der Heijden, et al, 1998, p.71. (note 14).

institute now intends to do more extensive trials to discover the rate that transgenic oilseed rape can create hybrid GM "oilseed-turnips". (end of extract)

Dr Norman Ellstrand, Professor of Genetics at the University Of California is one of the world's leading authorities in genetic engineering.

He comments on the economic implications for farmers of gene exchange between crops and weedy relatives. "We see this as a multi-million dollar problem. In Europe, there is already a big problem with gene flow between wild beet and cultivated beet. Oil-seed rape also has close relatives and is going to cause problems in the future. One would expect that the kind of genes that are now being engineered are going to be the ones that have a higher potentiality for causing trouble."

Dr Ellstrand on the likelihood of a major disaster: "It will probably happen in far less than 1% of the products...but within 10 years we will have a moderate- to large-scale ecological or economic catastrophe, because there will be so many products being released."

GENETIC ENGINEERING WILL NOT FEED THE WORLD

By Bob Phelps

First the Green Revolution, and now the Gene Revolution, are promoted as the cure-all for world hunger. Agribusiness may appear to deliver cheap food and fibre to Western consumers through global markets but the huge environmental, social and health costs are largely hidden, especially from urban dwellers. Genetic engineering will intensify, not solve, these problems.

Chemical/industrial agriculture has produced rural poverty and dispossession in Australia, while hundreds of millions of Third World people suffer chronic starvation, landlessness, unemployment and urban slums. CSIRO's Land and Water Division says two hundred years of Euro-centred farming has caused massive soil loss, salination, water pollution, species extinctions and desertification. Our ecosystems are being depleted at a rate far beyond replacement. For example, each kilo of grain fed to feedlot beef and battery chickens costs up to five kilos of topsoil, washed or blown away. We must reform the ways we are fed, clothed and housed.

Two main choices for agricultural production are now offered - the Gene Revolution or Sustainable Ecological Farming Systems. Genetic engineering would entrench industrial agriculture, through greater corporate control, just when The World Watch Institute is warning that the amount of food it can produce is in long term decline. In contrast, organics promise truly fresh, clean, green production, more employment and local food security.

Australian governments, committed to free trade and global markets, back the factory farming model and genetic engineering. Hundreds of millions of taxpayer dollars are being pumped into engineering plants, animals and microbes that suit our degraded environments, to grow bulk commodities for trade.

But as former CSIRO Chair Professor Adrienne Clarke laments, most of the genes being manipulated are already patented by foreign seed, chemical and food processing giants. These are the companies which have pushed mechanisation, synthetic chemicals and crop monocultures for the past fifty years. Their aim is monopoly control, with every organism creating a flow of royalties and profits back to head office

The following letter which details the extent of the hazards of GM sugar beet trials, and which was published in the Eastern Daily Press (Monday 17th May 1999), is from Jeremy Bartlett who has a doctorate in plant genetics from the John Innes Centre which has a world wide reputation for its work in the area of plant biotechnology:

HAZARDS OF GM CROP TESTS

May I congratulate you on your timely warning "New study warns of GM 'pollution' " (EDP, May 11). The potential spread of genetic material to other crops and into the wider environment is very serious. But even if GM crops are not produced commercially, genetic pollution may take place as a result of GM crop trials. Take the trial of GM sugar beet as an example.

Sugar beet is a biennial plant but is derived from wild, annual beets and therefore some plants bolt in their first year. Bolting beet plants can easily be missed, especially in large field scale trials. Under hot summer conditions beet can bolt and flower within 10 days, producing 20,000 flowers per plant and lots of pollen.

This pollen can spread 10-30km and cross-pollinate with other sugar beet or its sexually compatible relatives, as well as wild beets.

Worryingly, research has shown that GM plants are more likely to out-cross than non-GM varieties. So if one farmer or gardener within a 10-30km radius allows a single sugar beet, beetroot, spinach beet, chard or fodder beet plant to set seed after it has been cross-pollinated by a bolter from the GM crop, the genetic material will have escaped.

Genetic material could also spread via broken off pieces of plant or if plant material is moved by rabbits, mice or birds. Sugar beet seed is a particular favourite of crows, for example, and is still viable after 12-18 hours in a bird's digestive tract. DNA from GM beet can persist in fragments of leaf litter for up to two years and during this time horizontal transfer of genetic material to soil bacteria can take place.

These things could happen even in a reasonably well monitored crop trial.

However, not all trials are well monitored, as was shown when Monsanto was prosecuted earlier this year in Lincolnshire for not conducting crop trials according to rules laid down by the Health and Safety Executive.

To make matters worse, English Nature has serious concerns about the design of many of the current crop trials, so it is likely that they will produce little or no useful scientific information. British Sugar has stated that it has no intention of refining GM sugar beet in the foreseeable future.

So why do the trials in the first place?

Dr Jeremy Bartlett
Helena Road
Norwich

Seeds and Chemicals Contracts

One of the problems that Australian farmers will face, if genetically engineered crops become commonplace here, will be their complete dependence on the multinational biotechnology companies for their seeds. The multinationals are well into the process of buying up small and medium sized seed companies with the aim of controlling the market. Once that is accomplished they will be in a position to set prices with little or no competition.

Bill Christison, president of both the U.S. National Family Farm Coalition and the Missouri Rural Crisis Center delivered this speech on July 18, 1998, in St. Louis, Missouri at the "First Grassroots Gathering on Biodevastation: Genetic Engineering."

A few short years ago, I began to hear about biotechnology as it relates to agriculture. At first, it was BGH which our organisations vigorously opposed. Then, I began hearing about a genetically engineered soybean which would withstand the chemical, Roundup. A product brought to fruition by Monsanto. First, I wondered if this was a soybean that I should consider raising on my farm. The advertisement sounded good . . . use a single low cost chemical. The promise was that you could use less chemicals and produce a greater yield. But, let me tell you, none of this is true. The first problem . . . they wanted us to sign a production contract which limited what we could do with our production. It is our practice to produce our own seed for the following year's planting. Because the contract forbids this, it would have cost us 3 times as much for seed. And, then, there's a problem of paying for a patenting fee of several dollars per bag. We found chemical cost for our farm would escalate to a minimum of twice as much and we should not be applying less chemical, but actually more chemical. Then, we found GMO seed actually produces a lower yield because of the varieties that had been altered. Last year's yield book in Missouri printed by Pioneer Seed Co., a seed company with 45% of the market, shows a 5 bushels per acre average reduction in yield from GMO varieties.

A further problem . . . we have weeds that are resistant to Roundup already. The acceptance of GMOs by the U.S. farmer is predicated by the fact that farmers are hard pressed to survive financially, and have become acclimated to the idea that new technology is good technology. There is collusion across the United States between USDA, our land grant university systems and the Monsanto's of the world to facilitate this new world order which will bring about the globalisation and industrialisation of agriculture.

It is interesting to ask the question, Why is Australia so against the idea of farmers being able to save seed, especially in the developing world where farmers are not affluent enough to buy seeds on an annual basis? Will that philosophy be carried into the current investigation of this committee? Some indication of our stand is given in the following excerpts from published information:-

Australian Diplomats Thwart Progress at United Nations meeting on Farmers' Rights

NGOs Charge that Australia is "Bad Boy" on Negotiations to Insure the Right of Farmers to Save, Exchange and Develop Plant Varieties

Australia is distinguishing itself this week at a United Nations meeting in Rome as the single government that does not support the fundamental right of poor farmers to save seed from their harvest and exchange seeds with farm neighbours. The Food and Agriculture Organisation's (FAO's) Commission on Genetic Resources for Food and Agriculture is the Inter-governmental body responsible for debating control and access to the world's plant genetic resources. From 8-12 June over 150 governments are attending the Commission meeting in Rome to re-negotiate the terms under which agricultural germplasm is shared between nations, and how farmers are recognised and rewarded for their historic and ongoing contributions in conserving the world's plant genetic diversity.

"The Aussies' conduct in this meeting has been disgraceful, especially in light of their involvement in the plant pirating scandal earlier this year. Over the past two days the Australian government has consistently blocked constructive debate on the right of poor farmers to save seed," said Pat Mooney, RAFI's Executive Director.

RAFI, an international NGO based in Canada, and Australia's Heritage Seed Curators' Association (HSCA) were instrumental in exposing a scandal earlier this year involving plant "patent" (plant breeders' rights) claims by Australian institutes on seeds grown by subsistence farmers in Syria, India and elsewhere.

Australia's plant intellectual property claims became the subject of international controversy because the seeds that Australian institutes attempted to patent were merely imported from

international gene banks. The Australian breeders did absolutely no breeding work on the plant varieties that originated in the fields of Third World farmers. Under a trusteeship agreement with the FAO, farmer-bred seeds in international gene banks are held in trust for the world community - and are freely available to researchers. These collections are strictly off-limits to intellectual property claims. Since the Australian plant patent scandal came to light, Australian agencies have been forced to withdraw five Plant Breeders' Rights claims on farmers' varieties that came from gene banks protected by the FAO Trust agreement. But the issue is far from being resolved. Scores of other suspect intellectual property claims are still being investigated by RAFI and HSCA.

In reaction to Australia's plant patent abuses, the chair of the Consultative Group on International Agricultural Research (CGIAR) and the FAO took the unprecedented step of calling for a moratorium on intellectual property rights on all seeds held in trust through FAO. The moratorium is designed to put a halt to plant piracy rip-offs, and to give governments time to resolve how to protect genetic resources under a multilateral system - the purpose of the FAO Commission meeting in Rome this week.

"After Australia's abysmal record in recent months, we thought they'd be eager to show the international community that they want to take concrete steps to protect the right of farmers' to save seed, and to prevent further abuses of intellectual property. But it's just the opposite, said Henk Hobbelink of Genetic Resources Action International (GRAIN), an NGO headquartered in Spain.

"The Aussies were once accused of being aloof in these multilateral negotiations, but now they're being downright destructive," said RAFI's Edward Hammond. "They are the only government delegation that is not advocating the right of farmers to save, exchange and develop plant varieties," said Hammond.

According to Liz Hoskin of the UK-based GAIA Foundation, "Incredibly, the seed industry is to the left of Australia on this issue. The international seed trade association, ASSINSEL, has openly declared that it is in favour of the right of poor farmers to save and exchange seed, said Hoskin. "Australia is out on a limb on this issue, and citizens of Australia should demand that their government be held accountable," added Hoskin.

At a seminar held on Tuesday, 9 June (during the FAO Commission meeting) on the subject of the CGIAR moratorium and the FAO trust agreement, Australia did not even bother to show-up. The legal counsel of FAO, the Director General of the International Plant Genetic Resources Institute, and a representative from RAFI led the discussion. "Everyone was astonished that the Australians failed to participate. Their absence was a glaring example of their unwillingness to enter into constructive dialogue on the problem," said RAFI's Pat Mooney.

The tragedy is that Australia's uncompromising position may derail progress on a multilateral system to insure access to and conservation of the world's seeds. "What's at stake here is not only justice for farmers, it's conservation and use of genetic resources that are critical for world food security," said Pat Mooney of RAFI. "If Australia persists in thwarting these negotiations, the food security of 1.4 billion people - poor farmers who depend on farm-saved seed - is at risk," said Mooney.

Organic and Sustainable Farming

From the BBC news website 9 Jan 99

Organic farmers get government boost:

"Mr Brown (UK Minister of Agriculture), speaking to the Soil Association's conference on organic food and farming in Gloucestershire, said the extra money would be available in the spring. It will

mean that payments to farmers for most arable land will go up from £250 to £450 per hectare over the five years, and from £50 to £350 for other cultivated land in the uplands. And the present ceiling of 300 hectares on the area of land that can receive payments on any organic unit will be removed.

Mr Brown told the conference the increase was aimed at persuading more farmers to go organic in order to help to satisfy the burgeoning demand. The number of farmers in his ministry's conversion aid scheme doubled last year. He also announced that there would be more money for research into organic farming methods, and more resources for advising farmers on practical aspects of conversion."

Attached from NATURE 26/11/98 issue

Organic farming is best - official

HENRY GEE

Organic farming is not only kinder to the environment than conventional, intensive agriculture - but it has comparable yields of both products and profits. Without loss of production, organic farming can rebuild spent soils, prevent pollution and even combat the greenhouse effect. An extract from a radical 'green' manifesto? No - these are the implications of a sober report in Nature the result of a 15-year study to compare the performance of organic with conventional farming.

In the report, Laurie Drinkwater and colleagues from the Rodale Institute, Kutztown, Pennsylvania, sought to test the contention - a tenet in land management for decades - that the amounts of carbon and nitrogen in the soil are controlled by their net inputs, irrespective of their sources, artificial or organic. This seems odd to ecologists, who have long known that the passage of carbon and nitrogen through an ecosystem is profoundly affected by the numbers and types of species present, the quality of the organic 'litter' available for decomposition, and so on.

Their new report is dramatic proof that what works in a rainforest holds true down on the farm. The researchers simulated three kinds of farm: the first was a conventional farm, in which maize and soybeans were rotated, a mineral nitrogen fertiliser was applied before the maize was planted, and pesticides were freely used.

The other two 'farms' were organic. In one, legumes and grasses were grown to feed beef cattle, and the resulting manure was used as fertiliser for a maize crop. In the other, legumes were grown and then ploughed back, to provide a source of nutrition for a maize crop. Legumes, such as clover, peas and beans, harbour bacteria in their roots that extract nitrogen from the atmosphere, returning it to the soil.

The conventional farm grew just maize and soybeans. The other two systems were less intensive, as other grains and legumes were grown in addition. The conventional farm produced more crops - in terms of the amount of available carbon turned into plant material - than either of the other two systems. On the face of it, the conventional farm seemed more productive. But was it? between 1986 and 1995, the average annual maize yields from all three systems were very similar: 7,140, 7,100 and 7,170 kilograms per hectare in the manure-based, ploughed-in-legumes and conventional systems respectively. Over the past ten years, the economic profitability of the three systems has been comparable.

But the organic systems have further benefits. Soils on organic farms in which a mixture of crops are grown are healthier and have better structure than on conventional one-crop farms. They are better at retaining nitrogen and carbon in a variety of different forms. Because nitrogen fertilisers are not added all at once - as they are in a conventional farm - but released from soil stores throughout the year, less nitrogen is needed, less energy is used, and less nitrogen is washed out of

the soil to end up polluting rivers. Over a five-year period, 60% more nitrogen (as nitrate) was washed into groundwater from the conventional system than from either of the two organic systems. These results show that the passage of nutrients through a patch of ground is influenced by the plants grown in it, and how they are grown."

QLD: Food engineers warned to take note of market resistance

By Barbara Adam

BRISBANE, Dec 3 AAP - The push towards genetically engineered food could leave Australian-grown food shunned by the rest of the world, Queensland sociologists have warned. A nation-wide survey conducted by Central Queensland University PhD student Janet Norton found strong resistance to genetically altered food among Australian consumers, particularly women. In a paper to be presented to this week's Australian Sociological Association annual conference here, Ms Norton and two other academics found an overwhelming demand that genetically engineered food to be clearly labelled. Co-author of Public Acceptance of Genetically -Engineered Foods, Professor Geoffrey Lawrence, said the survey showed Australia's food industry could be poised to take the wrong path.

"Food manufacturing representatives are saying how important it is to go down the biotechnological path," he said. "At the same time, consumer groups are saying: 'Let's be very, very careful about this'." The survey measured consumers' feelings about blue roses, coloured by a cornflower gene, genetically engineered bruise-resistant tomatoes, pigs with a human growth sequence and the insect repelling bacillus thuringiensis (Bt) gene introduced to sheep and wheat. "This survey found consumers would accept products that assisted animal welfare or were neutral, like the blue rose, but when it came to ingesting food, they became very coy," he said. "What we find is that the more people learn about these products, the less they support them."

Prof Lawrence said the survey findings pointed to **a tension between food producers' desire for economically-produced foods with a longer shelf life and consumers' demands for "clean and green" produce.** "We're saying to scientists: 'You're doing this work in the laboratory with millions of dollars of public and private money without thinking about public acceptance'," he said. Prof Lawrence said the Australian food industry did not seem to be coming to grips with the yawning gap between what consumers wanted and what scientists were intent on producing. **"Australia could be left with food that no other nation will want by going down the biotechnological path,"** he said."

Guardian (London) July 29, 1998

Growth industry

Organic-food prices look set to tumble as supplies increase and farmers queue to join the government scheme to turn green.

Bibi van der Zee reports

The price of organic food looks set to drop as the number of farmers applying to go green hits record levels.

Organic food is finally becoming big business, after 50 years in the crank club. Nearly 140 applications have been received so far this year by the Ministry of Agriculture from farmers wanting to join the Organic Aid Scheme. There are 445 organic farmers in England and Wales.

Prices for organic food have been higher than for non-organic food partly because demand far outstrips supply, according to Dr Younie, the organic specialist at the Scottish Agricultural College.

Production costs and the expense of converting to organic farming will play a less significant part in the pricing as more produce comes on the market. He reports a fourfold increase in the number of inquiries from Scottish farmers wanting to go organic. "As the supply increases prices are bound to come down," he says.

The rapidly growing demand for organically grown fruit, veg, meat and dairy products has been noticed by supermarkets.

THE THREAT OF GENETIC ENGINEERING TO ORGANICS: ALTERED STATES ON THE FARM

Richard Hindmarsh

Organics is truly sustainable agriculture where humans adapt to nature holistically by applying ecological concepts and principles. In contrast, genetic engineering conquers nature through redesigning the cell's genetic structure. A pathway is created to circumvent biological limits to inter-species interbreeding - like chickens and potatoes, humans and fish, ad infinitum. Novel organisms are created through anti-ecological techniques. These are a far cry from, and a massive acceleration over, traditional breeding methods. Redefined as 'constructs', novel organisms become new fad consumer products or 'band-aid' solutions adapted to the symptoms of a terminally sick industrial agriculture.

In direct contrast to organics, GE is controlled by powerful global interests - not from concern for humanity or for the planet but to further business aims. Driven by petrochemical corporate interests, it would impose a centralised human-made system on nature legally controlled through patents.

Threats

GE poses serious threats to agro-ecosystems through the release of novel organisms. Concerns include: reduced biodiversity through GE monocultures using a few genes with commercial benefit; the proliferation of transgenic plants, which also pose as a channel for foreign genes to move to wild plants; increased chemicalisation through herbicide-tolerant crops; the evolution of pests resistant to biopesticides such as *Bacillus thuringiensis* (Bt), making naturally occurring bacteriums useless as biological control agents; more entrenched chemicalisation from nitrogen-fixing plants designed to absorb greater quantities of synthetic fertilisers or to utilise them more effectively; or the development of new strains of viruses or existing viruses able to cause more serious diseases through transgenic virus-resistant plants.

Another threat is where GE accelerates the trend of substituting crops with industrial systems based on cell culture. Biosynthetic food factories would be controlled by corporate giants. Farmers and consumers would have little choice over what is produced. Supplementing these factories would be contract controlled farming, the altered states way.

Yet another threat is the undermining of organic produce as a distinct commodity, through takeover of the organics standards and/or through the concept of functional foods coupled to non-labelling of designer foods. This all relates to image. Organics has a gold-mine clean and green image whereas that of genetic engineering is very tarnished. By organics standards, 'Frankenfoods' are counterfeit and can only masquerade as clean and green. Many health problems remain unresolved, such as concerns over new toxicants, allergens, nutrition, new substances, unexpected effects, and other harmful side effects. Bizarre images are conveyed at the "Transgenics Cafe" - spiced potatoes with waxmoth genes, tomato juice with flounder gene, blackened catfish with trout gene, scalloped potatoes with chicken gene, and so on.

No wonder 'DNA Incorporated' desires the healthy organic image. If this was allowed, the organics movement would be undermined, would split, and would be transformed eventually into intensive agriculture.

Another strategy to get novel foods accepted appears to be the Re-categorisation of all food. Blurring the distinctions between food types would be four classes of functional foods (1) existing foods with a 'health' advantage over similar foods, eg, oats (organic produce could be slotted in here), (2) modified processed foods (3) food ingredients specifically designed as additives, and (4) novel foods to produce high biological functionality - whatever that means. If organic produce is not included in category one for now, it could be incorporated later if standards get changed.

The [London] Guardian March 5 1998

US plans would banish genuine organic produce

FOOD FASCISM

George Monbiot

There's no mystery about why US agribusiness wants its Washington subsidiary, the USDA, to set these new standards. The consumption of organic food is rising by 20-30 per cent a year and, in some countries, is likely to become the dominant land use. Organic farming is labour intensive. It responds best to small-scale production, matched to the peculiarities of the land.

Big business simply can't operate in an environment like this. There is no potential for hegemony. What it can't control, it must destroy. The United States government claims to be the champion of free trade, but it is, in truth, emphatically opposed to it. It seeks instead to exercise a coercive power of central control and legislative diktat, on a scale which makes the command economies of the old Soviet Union look like a village paper-round.

From: Global Pesticide Campaigner - by Jane Rissler
Sustainable Agriculture: A Better Path For Pest Control

There is a better approach to pest control than chemical or genetically engineered products aimed at one or a group of pests: pest management methods developed in the context of sustainable agriculture. Also known as alternative agriculture or low-input sustainable agriculture, these approaches to profitable farming recognise the ecological nature of agriculture and incorporate responsible stewardship of natural resources.

What this means for pest control is that growers (and agronomists) need to change their expectations and methods. In sustainable systems, the goals are prevention and management, unlike the control or eradication objectives of chemical farming. Sustainable management strategies emphasise prevention of pest problems by providing conditions that optimise the effect of natural mortality factors (e.g., biological enemies and weather) to reduce pest populations. They depend heavily on large amounts of ecological, biological, agronomic, and climatic information.

In sustainable systems, farmers use a variety of cultural, biological, and mechanical methods to avoid or reduce pest problems. Crop rotations, intercropping, cover crops, altered planting and tilling schedules, new tillage systems, and natural biocontrol agents are some of the many options available to growers adopting sustainable strategies.

Biotechnology could make contributions to sustainable agricultural systems, but those contributions would have more to do with enhanced understanding and manipulation of crop/pest/environment interactions than with producing specific engineered plants or microbes for the marketplace. For

example, modern molecular biology and genetic techniques, in concert with ecological studies, could be used to dissect the relationship between soybean seedlings and the charcoal rot fungus as it is influenced by environmental factors. Under certain environmental conditions in the tropics, charcoal rot can decimate young soybean plants. If the molecular and biochemical steps in disease development were characterised, scientists could determine not only which steps are susceptible to control measures, but what measures would be successful in interrupting disease development. They could develop specific, targeted strategies to block critical interactions and prevent seedling rot. These strategies might employ natural disease suppressive agents in crops interplanted or rotated with soybeans, incorporate specific genes for rot resistance, enhance soybean's natural defence mechanisms, or involve altered cultural conditions and planting dates.

Sustainable agriculture provides an appropriate context for developing biotechnology. Pest control is only one area in which biotechnology is on the wrong path. Biotechnology development in general is headed in the wrong direction. In a recent critique of modern agriculture, Angus Wright comments on the path taken by agricultural biotechnology:

[Biotechnology promoters) want to remove agricultural research and the reproduction of crops even farther from the wisdom of practicing farmers and the slow process of adaptation through natural and cultural evolution. We need instead to move in the opposite direction, toward the re-adaptation of agriculture to the complexity of nature and the requirements of healthy human beings and healthy human communities.

Genetic engineering techniques could prove useful for analysing and understanding the complex and interwoven ecological and biological processes that make agriculture possible. Yet its proponents circumscribe its potential by using it to design products that extend a non-sustainable, non-ecological agricultural system.

The development of biotechnology should be shaped within the context of sustainable agricultural systems, ecologically based systems that reflect the goals of long-term economic viability, productivity, and natural resource stability. Rather than invest taxpayer dollars in biotechnology research that supports conventional agriculture, publicly funded agricultural research must be directed toward sustainable approaches.

We should reject high-input, industrial-style monoculture; avoid quick-fix, short-term solutions; and adopt ecologically based, sustainable farming systems. Biotechnology techniques should only be used within ecological research for innovative and sustainable solutions to agriculture's economic, social, and environmental problems.

Pesticide Action Network North America Updates Service

August 21, 1997

Organic Sales Up in 1996

For the seventh year in a row, U.S. organic industry sales grew more than 20%, to US\$3.5 billion in 1996 from US\$2.8 billion in 1995, according to a recently published survey in *Natural Foods Merchandiser*. "It's been a typical growth year of a relatively youthful industry," said Bob Scowcroft, director of Organic Farming Research Foundation (OFRF), a non-profit organic advocacy group. The organic market experienced strong sales in many product categories, including dairy, baked goods, ready-to-eat products, and fruits and vegetables. The market also grew in regions of the country where organic foods have traditionally sold less well, including Montana, Iowa and Kansas.

Rapid growth in the natural foods industry has not gone unnoticed by Wall Street investors. In the past 15 months, eight natural products companies have gone public, raising more than US\$618

million by selling stocks. Investment analysts expect that this trend is only just beginning. "It's a very attractive industry for investors because it's growing fast and many companies that were private are ready to go public," according to one analyst at the investment firm Adams Harkness & Hill in Boston, Massachusetts

Although the "natural products industry" includes more than just organic goods -dietary supplements, for example -- much of the investor excitement is focused on retailers that emphasise organic products such as Whole Foods Market Inc. and Wild Oats. According to OFRF's Bob Scowcroft, the boom in initial public stock offerings by organic companies has barely started. He pointed out that more than 50 investment bankers signed up to attend his foundation's 1997 conference -- up from five in 1995.

Sources: Natural Foods Merchandiser, June 1997 and June 1996; San Francisco Chronicle, August 2,1997.

Risk Assessment

Agri-Industry Europe

March 13, 1998 No. 17

GENETIC ENGINEERING: SCIENTISTS AND DOCTORS CALL FOR MORATORIUM

Genetically -modified organisms (GMOs) have appeared rather suddenly on the medical and agricultural scene, leaving no time for scientists to assess their real benefits and their possible negative impact on health and the environment. These observations have led a group of European scientists, doctors and health professionals to appeal on March 6 for a moratorium on the marketing of GMOs, their dissemination into the environment and their presence in food. They cite the "precautionary principle" adopted by more than 100 Heads of State and Government at the Rio Earth Summit in June 1992.

In a Statement on Genetic Engineering issued at a public hearing on GMOs organised by the Greens in the European Parliament on March 5 and 6, the doctors and scientists point out that GMOs are the product of a considerable effort in the area of molecular biology and genetic engineering in both the public and private sectors. However, the consequences of releasing GMOs into the environment, their behaviour in ecosystems or in animal or human food have been the subject of very little research.

There is as yet no scientific consensus as to the safety of these products. Economic considerations dominate, due to the enormous profit potential on the biotechnology market. Policy-makers, they note, are "overwhelmed by the rapidity of scientific advances and pressure from industrial groups.

They comment that more and more voices are being raised concerning scientists' responsibility as concerns the risks involved in commercial applications of their research. They feel that total liability for damage to health or the environment must be assumed, in the EU, by GMO users, both as concerns experimentation in open fields and in commercial applications.

John B. Fagan, Ph.D.

Assessing Risk:

The risk of introducing hazards into foods is inherent in the use of recombinant DNA technology. Not every genetically engineered food will be harmful, but there is a very real probability that a given genetic alteration will lead to unanticipated effects that could damage the health of consumers.

The probability of risk from any given genetically engineered food may be small. This low probability has been used to argue that it is unnecessary to take this risk seriously, and therefore that stringent safety testing is not needed.

This view is not scientifically responsible. Thousands of genetically engineered food products will be brought to market over the next several years, and will be consumed by many millions of people. The small risk that any given product will produce unanticipated harmful effects translates into a virtual certainty when that risk is extrapolated to the consumption of many products by large populations over extended periods of time.

PHYSICIANS AGAINST GENETICALLY ENGINEERED FOOD

A suggested procedure for safety assessment of new technologies

For the reasons presented above, we, the Physicians Against Genetically Engineered Food, think it is most important not to appoint authorities to be in charge of safety assessment of the technology they are themselves deeply involved in. In stead, an interdisciplinary commission of scientists of many disparate disciplines should be appointed. The chairman should always be a scientist who has documented a good skill in non-reductionistic interdisciplinary research with systemic analysis of complex phenomena. Scientists in fields directly related to the technology should not be members of the commission. The work of the commission should be arranged as *public hearings* assessing the scientific quality of the factual evidence and opinions presented by various authorities on the technology in question. The scientists responsible for the safety assessment should have a high degree of integrity in addition to being leading researchers- "Master scientists". And be clearly independent of the industrial interests involved. The hearing should carefully investigate the research of all potential hazards of the technology. Its duty would be to answer the question whether the amount and quality of the research has been enough to reliably assess all conceivable potential hazards.

The analysis has to be presented in such a language that it is possible for non-scientists to understand it. Every observation that lies at the basis for the judgement has to be assessed and evaluated for relevance and presented in the same pedagogical way. Every critical opinion pronounced by scientists in the society (irrespective of his position in the scientific prestige hierarchy), every observation indicating potential hazards and every doubt expressed by non-scientists has to be considered and openly assessed by the commission in a pedagogical manner so that everybody can judge if their conclusion is logical, impartial and objective. Thereby, it will be possible for people and decision-makers to judge the objectivity of the safety assessment of the commission.

The suggested procedure contrasts with present practices. An extreme example of the opposite to the above suggested procedure was the assessment of the safety of the CIBA maize made by scientists appointed by the European Union. In this case, the assessment documentation was kept secret (but leaked out). Only the conclusion that the maize was safe was published.

Finally, and most importantly, the commission should address the question if there are alternatives that are safer to Health and Environment and have a better compatibility with ecologically sustainable development. If such alternatives are available, there is no reasonable justification to allow a potentially hazardous technology. And if there is no alternative, it is most necessary to judge whether there is a reasonable relation between the risks and benefits of the technology. If not, exploitation of the technology should not be allowed.

The suggested procedure, might perhaps help prevent the history of biased authorities to repeat itself in the case of the exploitation of new and powerful technologies. At least it would be a considerable improvement compared to present practices. If the suggested procedure had been

applied before market release, neither the exploitation of Nuclear Energy nor of Genetically Engineered foods would have been allowed because the knowledge required for reliable safety assessment would have been found to be seriously insufficient.

In any case, it is contrary to fundamental democratic principles to let a technology that may have important Health and Environmental impacts be forced upon people without careful and honest information about all relevant scientific facts to them and their elected representatives. The present attempts to force GE-foods upon consumers against the will of the majority in many countries by misleading them through systematic propagandistic manipulation with the aid of PR experts, represents a serious contempt for democracy, characteristic of authoritarian states. The same goes for the systematic efforts of the Gene Manipulation Industry to prevent the freedom to choose what to eat by counteracting labelling and by pressing for a change in the regulations for organic food.

Considering the power of today's technology it is most necessary to start open public investigation of the suggested kind in all cases of new technologies that may endanger the environment or the Health of people. Starting immediately with genetically engineered food and the release of all kinds of GE organisms into the environment. - Before it is too late.

SUNDAY INDEPENDENT February 21, 1999

GM foods - Revealed: the secret report By Marie Woolf

A damning scientific study, carried out for the Government two years ago but not published until now, has concluded that genetically engineered oilseed rape could breed with ordinary farmers' crops and make them "inedible". It says that "contamination" of farmers' ordinary fields is "inevitable" under current farming practices. The report was carried out by the prestigious Scottish Crops Institute for the Department of the Environment. Its most worrying conclusion is that GM oilseed rape is much hardier than previously thought and can survive to breed and pass on its traits to ordinary plants of the same species. It found that the pollen from genetically altered oilseed rape could travel far farther than the designated distance between trial-crops fields and create hybrids which could ruin farmers' ordinary crops. It also warns that unless fields full of engineered plants are completely isolated - which under the current regulatory regime cannot be done - there is no way of stopping hybrids from growing.

The report's existence has sparked protests by environmentalists who say it proves that ministers have known of the risks to Britain's farms for two years but have carried on supporting GM crops regardless. "While the Government denies suppressing the report on the environmental risks of GM crops, this shows that these concerns are very real," said Tony Juniper, Friends of the Earth policy director. "This disclosure renders the reassuring signals on the safety and desirability of the crops very hard to swallow." The report, titled Investigation of feral oilseed rape populations: genetically modified organisms research report no 12, was published this month after the furore over GM food blew up. It was recently circulated to scientists on the Government's Advisory Committee on Releases into the Environment which gives consents to grow and market GM seeds in Britain. Members of the committee have privately expressed "surprise" and "worry" that they had not seen the report before. It includes a preface from the Department of the Environment, Transport and the Regions dated 1997.

SUNDAY INDEPENDENT February 21, 1999

GM foods - Revealed: false data misled farmers

By Marie Woolf

Monsanto, the genetic engineering company, included false information about a genetically engineered crop it wants to sell in a safety assessment submitted to government advisers.

The gene giant was forced to carry out its research again after it emerged last month that crucial information about the gene it proposed to put in a new strain of maize was incorrect.

Monsanto was labelled "incompetent" by scientists from the Government's influential Advisory Committee on Releases into the Environment (Acre). The committee accused Monsanto of submitting sloppy research, "poor interpretation" and work far below required standards.

The agro-chemical company misdefined the gene it planned to insert into the maize which was genetically engineered to be resistant to Monsanto's Roundup herbicide. Minutes of Acre's meeting last month show that members were furious that Monsanto had asked them to approve a marketing application based on inaccurate information. Sources close to the meeting say Monsanto was called "incompetent" and that the standard of its work was "wholly unacceptable".

Acre told Monsanto to do its research again after Monsanto scientists - asked for clarification about their research - realised that their "molecular data . did not support the conclusions".

The minutes of the meeting, on 13 January 1999, deliver a sharp rebuke to Monsanto, saying that ". the molecular data submitted by the applicant did not support the conclusions regarding genomic organisation of the transgenes".

The Times (London) April 15, 1999 - Bees 'spread genes from GM crops'

BYLINE: Nick Nuttall

Ministers to review guidelines as new study suggests buffer zones may be futile, writes Nick Nuttall
GUIDELINES on the isolation of genetically modified crops are to be reviewed by the Government, after a study found that bees could carry pollen four kilometres from test sites. Farm scale trials to assess the impact of the crops have begun with "buffer" zones between them and the countryside of just 50 metres. Government rules on commercial plantings of gene altered crops suggest buffers of 200 metres. But the new findings, published yesterday, indicate that a revised strategy may be needed to allay public concern. The 4km distance is much further than previously supposed.

The researchers claim that the spread of so-called "transgenes" from farm to farm will be widespread should commercial planting's go ahead. The findings have come from a team at the government-funded Scottish Crop Research Institute in Dundee. Michael Meacher, Minister for the Environment, admitted that bees could take pollen large distances. In a House of Commons written reply yesterday, he said that despite precautions "it has to be recognised that bee activity may in some cases involve the dissemination of GM pollen beyond the isolation distances traditionally used".

A spokesman for the Department of the Environment said that studies were under way into the consequences of bees transporting pollen over large distances. The isolation guidelines would be reviewed by the Advisory Committee on Releases to the Environment in the wake of these studies. John Crawford, one of the research team, admitted that it had been surprised by the findings. The distance over which oilseed rape pollen travelled had been unknown and of little consequence. But concern over the impact of gene altered crops was concentrating scientific minds. "We were getting cross- pollination over large distances. There is no doubt that pollen from genetically modified crops will get out," Dr Crawford said."

April 23, 1999

Prof. Joe Cummins (Professor Emeritus - Genetic Engineering - University of Waterloo, Ontario)

I was recently asked to comment on USDA comments supporting their rules on transgenic crops. At least 99% of the commercial transgenic crops incorporate viral genes, either as promoters or to control virus My comments on USDA rules on virus genes in transgenic crops are below. The

USDA regulations on crop genetic engineering seems to be based on views of genetic recombination that utterly misrepresent the evidence available and the science of genetics. Their comments on viral recombination totally ignore a wide body of literature on recombination involving virus genes incorporated into crop plants.

Turning to the USDA comments:

1. USDA claims "there has been no report of such a recombination" . I find that comment strange because there is a huge body of studies in that area. Not only is there good evidence but the evidence shows that the recombination is very frequent as many as one in five transgenic plants showing such recombination. (he lists 7 references)

2. USDA claims " that although recombination could theoretically occur, it would have to be between two 2 viruses which already affect the host plant (the virus providing the engineered gene and another virus which would infect the engineered plant in the field)".

The USDA view here describes the situation in the many experiments they seem unaware of. However, the plant virus nucleic acid such as the DNA of many plant pararetrovirus may be propagated in insect baculovirus. Recombination involving insect virus , or for that matter the viruses of higher animals ingesting plant material engineered to contain virus genes should not be ignored.

3. USDA claims "such recombination could or would have already occurred in the field naturally". All recombination taking place in the field is natural while gene cutting and splicing in the laboratory is unnatural. Certainly "such" recombination already occurred in the field. However, it is clear that the frequency of recombination to create new genetic variations leading to enhanced virulence of the virus is increased by orders of magnitude when virus genes are present in every cell of every plant in a crop planted to millions of acres.

4. USDA finally claims "but such recombination is so rare (occurring on an "evolutionary" time scale) that the event is of vanishingly low probability" The last USDA comment suggest the agency may be part of a bureaucratic never never land run by people who believe that nature must follow the rules of USDA. The USDA comment is truly bizarre , it ignores the many studies showing high rates of recombination of viral genes in transgenic crops.

Clearly the USDA regulations should be changed to reflect true scientific facts not the desires of agricultural bureaucrats."

Mark Griffiths BSc FRICS FAAV, environment spokesman for the Natural Law Party (UK) wrote, and spoke, to Prof. Hagedorn who is an Extension Specialist within the Virginia Co-operative Extension Service operated in conjunction with Virginia State University and the US Department of Agriculture (USDA). The service is part funded by both state and federal governments. As an Extension Specialist Chuck Hagedorn's task is to transfer research findings and agronomic advice from the service partners directly to working farmers in Virginia so that they have access to the best science when selecting crop varieties and designing field management strategies. Similar arrangements exist in other US states.

As a scientist Chuck Hagedorn was not entirely happy with the way US farmers are being drawn into using what many regard as an unproven technology. He agreed to go 'on the record' regarding some of his observations about the way GM crops have been introduced in the States:

"Traditionally, companies in the US introduce a new variety, and our Extension crop specialists (in each state where the crop is grown) then field test the new variety for at least 3 to 5 years. During this field testing process the Extension crop specialists introduce the new variety to farmers in their region and give them unbiased information (the good points and bad points) about growing the new

variety. The Ag companies get good information about the performance of their new varieties from this 'traditional' crop evaluation process as well.

With the GM crops, this traditional process has been largely bypassed, mainly due to the rush to try and establish market share with the GM crops. Now, the Ag companies are going directly to the farmers with contracts for growing their GM crops, and the Extension crop specialist is 'out of the loop'. In the US, sales of the GM crops to farmers have gone wild, and farmers all want them - whether they need them or not. This is a classic case of what has been described in the literature as a situation where commercial development and marketing is way ahead of the science.

Our USDA is now deregulating GM crops with great speed, so I don't see the situation changing. It will take some type of major problem (such as a Bt-resistant cotton weevil or a Roundup resistant weed) to make USDA take a slower approach. The GM crop advocates, of course, claim that no such problems will occur. I don't think it wise to presume to be in such complete control of biology."

However, unlike spray insecticides, the Bt pesticide gene resides permanently in the environment without molecular breakdown throughout the life-cycle of the plant. The pests are, therefore, constantly exposed to the toxin (which, incidentally, remains in the final food product) and as a result they mutate rapidly to create their own resistance to it.

Consequently many farmers now have to spray insecticide on their genetically engineered Bt crops in addition to trying to make use of the toxic gene. Effectively they have to pay twice for pest control, once through the 'technology fee' that comes with the GM seed and again when they purchase and apply insecticide on the crop. It is worth remembering that the original purpose of these crops was to make such sprays unnecessary.

Such is the rapid breakdown of this technology that the EPA has now ruled that new Bt varieties can only be planted on part of a farmer's corn acreage. The somewhat shaky idea is that by having some of the crop in non-Bt varieties the pests will have somewhere to go where they can reproduce without producing Bt resistance mutation.

It was at this point that Chuck Hagedorn's remarks about the Extension specialist 'being out of the loop' took on a whole new meaning. The bizarre situation surrounding the Purdue corn trials appeared to be clear confirmation that the biotech companies were doing their best to keep transgenic varieties away from the traditional independent tests which would make it possible to compare their performance with unmodified varieties. Transgenics are sweeping America thanks, at least in part, to a huge independent testing vacuum. This vacuum is conveniently providing a walkover victory for commercial imperative and sophisticated marketing, over objective science and genuine utility.

With diligence some information can, however, be dug up. Trials by Cyanamid on nearly 300 test sites across the US showed that high performing non-modified varieties produced yields up to 20% more than glyphosate herbicide resistant transgenic soybeans in 1997. Not surprisingly the breeders of the transgenic varieties have asked to see the raw data behind Cyanamid's claims. Neither side, however, seems keen to discuss their raw data.

So is it possible to find any independent data? Well, there is a little and it makes interesting reading. The University of Purdue has done some work which looked at the yield performance of GM soya varieties in 1997 compared with non-modified varieties. Herbicide transgenic soya varieties yielded on average between 12% and 20% less than unmodified varieties grown at the same locations."

Even Bob Shapiro, CEO of Monsanto has some doubts - ""But we realise that with any new and powerful technology with unknown, and to some degree unknowable - by definition - effects, then there necessarily will be an appropriate level at least, and maybe even more than that, of public debate and public interest."

Bob Shapiro, Chief Executive of Monsanto, admitting that the effects of genetic engineering are unknown and "to some degree" unknowable (SWF News interview, San Francisco, 27 October 1998).

Export Opportunities

FOOD BYTES #12 (23/9/98) contains the information that American biotech exporters are now deeply worried about the threat of consumer "right-to-know" labelling laws being passed in Japan. Recent polls show 80-95% of consumers in the industrialised world demanding labelling of GE foods - primarily so that they can avoid buying them. Novartis held a national poll in the U.S. in February, 1997, and a full 93% of Americans said that all genetically engineered foods should be labelled.

May 22, 1998

Nikkei English News via NewsEdge Corporation : TOKYO (Nikkei)--Kanematsu Corp. (8020) will start a service in June certifying that food products have not been genetically engineered. The service, the first of its kind in the world, will be offered in cooperation with U.S. organisations including Farm Verified Organic, which certifies foods as organic.

The trading house will allow certified food producers to indicate that their products have not been genetically altered. The service is in response to growing concern among consumers over genetically-modified foods.

The service will initially cover only soybean and corn food products. Kanematsu will examine food products during the production process, including cultivation and shipping, at the request of clients.

Farm Verified Organic's Japanese office will manage the overall certification program. Kanematsu will serve as the Japanese agent for a U.S. company which will be in charge of checking samples to determine whether foods are genetically engineered or include genetically-altered ingredients.

April 8, 1998

TOKYO - Inter Press Service via NewsEdge Corporation : A growing number of Japanese consumers are up in arms against the imports of genetically modified food products, which are not subject to labelling despite their easy availability here.

Despite assurances from the government, consumer groups say these products could be hazardous to health and carry serious environmental implications.

"The Japanese are being used as guinea pigs by rich countries and their corporations in the experiment of expanding genetically modified food," says Setsuko Yasuda of the Consumer Union of Japan. "But the message from us is 'Stop.'"

From The Express UK) 9th October, 1998

Customer power is forcing supermarket giants to clamp down on genetically modified food. ASDA has banned GM ingredients from any new "own brand" products in its 220 stores. It is also asking its suppliers to find alternatives to the main GM crops - soya and maize - for its processed food.

In another move ASDA has joined Tesco in introducing GM food labelling that goes far beyond the new Euro laws. The measures come following a campaign by the Express for consumers to be given a choice over whether or not to eat GM Foods. The supermarkets made their stands after consulting consumers across the country. Other supermarket chains will now come under pressure to follow suit. Last night environmental campaigners Friends of The Earth welcomed the tougher buying policies and challenged other chains to follow the lead of Tesco and ASDA. Biotech campaigner Adrian Bebb said "ASDA should be congratulated for banning GM ingredients in new food lines but I hope they will follow the lead of the Iceland store chain and ban GM ingredients in all own brand products." He added "polls show people don't want GM food. Supermarkets should not use labelling as an excuse for ducking their responsibilities"

A recent MORI survey revealed that 61 per cent of the public don't want to eat GM food; and 77 per cent support a ban on the commercial growing of GM crops.

FOOD BYTES

News & Analysis on Genetic Engineering & Factory Farming

Issue #2 (Sept. 24, 1997)

Grain Cartels Secretly Trading in Non-Genetically Engineered Crops

Because of mounting consumer concern, especially in Europe, a growing international trade has begun to develop in corn and soybeans--as well as products derived from these grains--which are tested, certified, and labelled as non-genetically engineered. Genetic ID in Fairview, Iowa and TNO Nutrition in the Netherlands, two labs testing for genetic contamination, report a "brisk business" as food buyers and manufacturers scramble to meet increasing consumer demands for non-ge products. Polls in the USA, Europe, Canada, Australia, Japan, and other industrialised nations continue to find 80-90% of consumers demanding mandatory labelling of genetically engineered foods--mainly so that they can avoid buying them. Sales of organic or "biological" products are rapidly increasing, partly in response to the gene foods controversy.

The world's largest grain multinationals (Cargill, Continental, Archer Daniels Midland, Bunge, Central Soya, etc.) continue to claim publicly that it is "impossible," or at least "economically impractical," to separate out and label gene-altered and regular grains. But recent behind-the-scenes surveys of numerous grain handlers and grain dealers in the USA tell a different story. The bottom line is that Cargill, ADM, and the other grain cartels are already segregating or sourcing non-ge soy and corn and supplying it secretly to some of their major European customers. Companies such as Tesco, the largest supermarket chain in the U.K., seem to have already made "backroom deals" with the cartels to supply them with all the non-ge grains they need--as long as they, the buyers, agree to keep their sources secret.

This way Tesco gets a marketplace advantage over its other British supermarket rivals by being able to advertise that it has a full line of non-ge products, while the grain cartels avoid risking the loss of their dominant market share to independent grain brokers and shippers. These "independents" have already begun to sell significant amounts of non-ge grains to European buyers such as SPAR, the Austrian-based supermarket chain. Also, under this biotech and cartel-friendly arrangement, the US Department of Agriculture and the Clinton Administration can still claim that "segregating" ge and non-ge grains and foods are impossible; while European Commission and other EU authorities have a handy excuse to back off from demanding that the US government require mandatory segregation of gene-altered crops.

A Continental Grain spokesperson in Chicago admitted to the Pure Food Campaign in August that they are "taking orders" for certified non-ge grain for next year's crops. In addition the PFC has learned that a number of major US food multinationals have begun making preparations to segregate and test their products, so as to avoid consumer boycotts--both overseas and in the US. But again, why all the secrecy? First of all, according to food industry experts, besides their cosy relationship with the agri-toxics and biotech companies, the grain cartels and the factory farm food manufacturers fear setting a precedent. If they bow to "irrational" consumer demands to separate out biotech foods and grains, then what is to prevent customers from demanding that they do the same thing with chemically contaminated grains and foods?

From: The Guardian (UK) 4th June, 1998

The supermarkets, keen in a fiercely competitive industry to keep the consumer on board, have moved faster than the European Union. Some have tried to source foods which have not been genetically modified or have gone ahead and labelled a few products which use GE soya and maize in an unadulterated form.

So far only Iceland Frozen Foods, with 770 outlets and 16 per cent of Britain's frozen food market share, has bitten the bullet and committed to avoiding GE foods in any form. In a personal crusade, Malcolm Walker, its co-founder and chairman, decided that his shops would not sell genetically modified foods and he has insisted that if suppliers use soya or any ingredients derived from it they must come from a non-GE source.

From: The Guardian July 22nd 98.

Iceland, the supermarket chain that has tried to avoid all GM products is chipper. Founder Malcolm Walker tells us that sales are up 16%, though how much of it is due to the GM ban is unclear.

Walker notes that the US Soya Bean Association, having declared that it could not segregate GM and non GM soya, is now offering what it calls 'identity - preserved'. That means GM free soya.

Sainsbury's says it has managed to source non-GE soya for all but 30-45 of its products, which will be labelled from next month, (although it does not include ingredients derived from genetically modified foods in which the DNA or protein is no longer detectable, such as soya oil, in this).

AgPura News - May 1998

This last season's canola crop was approx 898,000 tonnes of which at least 550,000 tonnes was exported. Traditionally Australia's export canola crop goes predominantly to Japan (approx 95%) with remainder going to Bangladesh and recently China. The EU is the world's 2nd largest producer of canola(rapeseed) and is pretty much self sufficient however they do export and import canola. Traditionally the EU sources its top-up canola from Canada.

This year Canadian canola was banned from import into the EU as 40% of this year's Canadian canola crop were genetically engineered varieties and it is not segregated but mixed. This year 3 large shipments of Australian canola(100,000 - 150,000 tonnes) went to Europe for the first time. Most traders in Australia do not wish to discuss the issue and many deny that the Australian canola went to the EU because it was non-GMO (including those that shipped it). However the circumstances and figures speak for themselves. Certainly the farming industry in Australia and industry organisations are ready to embrace GMO crops whole heartedly **and probably none of the canola farmers who grew the canola that was sold in Europe will ever be aware that was the market, and it went there because it was non-GMO.**

AUSTRALIA TO SHIP LARGEST YET CARGO OF CANOLA TO ...

OTC 08.01.99 01:27

SYDNEY, Jan 08, 1999 (Asia Pulse via COMTEX) -- The New South Wales Grains Board said today it has sold the largest cargo of canola to ever leave Australia. The 57,500 tonne shipment is valued at \$A26 million (\$US16.53 million) and will lead to a record shipping program for 1998 which is expected to total 350,000 to 400,000 tonnes, it said. Graham Lawrence, managing director of the NSW Grains Board said the cargo is bound for oilseed crushing plants in Europe. "Europe has moved to become a major buyer this year because Australia is the only country to guarantee non genetic modified canola," he said.

Canada has lost \$300-400 million in canola sales to Europe over the last year because government authorities have followed the US model of co-mingling GE and non-GE grains. This year over 50% of Canada's 13.4 million acres of canola are genetically engineered.

The following comments indicate that Australia has a good future if we avoid a premature commitment to genetic engineering of our food crops:-

In Europe the controversy over gene foods continues unabated. Consumer studies by Monsanto's American polling firm recently leaked to Greenpeace International showed that public opinion in Great Britain and Germany has turned even more strongly against GE foods in recent months. According to the poll, conducted by Stanley Greenberg, "the broad climate is extremely inhospitable to biotechnology acceptance. Over the past year, the situation has deteriorated steadily and is perhaps even accelerating, with the latest survey showing an ongoing collapse of public support for biotechnology and genetically modified (GM) foods." The report goes on to state that even the "media elites are strongly hostile to biotechnology and Monsanto. They think the Government is being too lax and believe they must expose the dangers..."

The Evening Post (New Zealand)
April 14, 1999

The European Union has canned an order for genetically modified, pesticide-resistant canola, which American food giant [Monsanto] is proposing to grow in New Zealand.

Monsanto plans to seek approval for New Zealand's first commercial planting of a genetically modified crop, Roundup Ready canola seed. The modification allows the crop to survive spraying with the pesticide Roundup, which will kill weeds around it.

Monsanto wants approval for Canterbury and Southland farmers to produce the seed for Canadian seed company [Zeneca], which it says is struggling to meet worldwide demand.

However, Green Party agriculture spokesman Ian Ewen-Street said the EU had cancelled this year's order, worth tens of millions of dollars, and switched to Australia because Australia could guarantee its canola crop was not genetically modified.

He said the cancelled order would have a huge impact on Canada because Europe took 40 percent of all canola produced.

Other countries have also refused to take it, including Japan, Thailand and Australia, he said.

Today (13/10) the Jornal Gazeta Mercantil [similar to Wall Street Journal] in Brazil published a half-page article; I'll only translate the beginning.:

"Transgenics in circle of waiting" - Brazil's Agriculture Minister had a negative reaction regarding import of soya

The Brazilian government will put the breaks regarding authorisation for the commercialisation of genetically manipulated soya. The agriculture Minister, Francisco Turra, confirmed to this

newspaper yesterday that the negative reaction of Japan regarding the diffusion of transgenic varieties in Brazil will hold up the process of approving commercial roundup-ready soya, produced by Monsanto Brazil.

Turra returned last week from a trip to Japan where he met government members, businessmen and executives from trading companies. In his talks, he clearly felt the interest of Japan to increase the importation of soya from Brazil, but at the same time he heard condemnations regarding Brazil adopting transgenic soya.

"We must be more careful with this approval, independent of the decision that the Government commission CTNBio has decided that this new soya doesn't create damage to the environment or health problems to man, we have to discuss the whole thing from a marketing view point", said Turro. Or in other words, what would of greater advantage for Brazil - to adopt or not adopt transgenic soya.

Brazil soya exports correspond at present to 1,5 billion US\$ out of a total of 5 billion; i.e. 30% of Japan's imports. Apart from the fact that transgenic soya costs the farmers 25% less than other varieties, the Japanese or Europeans put major restrictions on the entry of products into their territory."

Recommendations

1. The committee to take note that genetic engineering, in its present formative stage, has the capacity to destroy our environment, and therefore more emphasis should be placed on research in, and assistance to, organic and other sustainable agricultural methods. No general use for farming be allowed until such time as the technology is known to be neutral in its effects, and capable of producing, on every occasion, exactly what is expected.
2. Contacts to be made with all countries that are rejecting genetically engineered foods with a view to replacing their present suppliers, if they are not able to guarantee GE-free exports.
3. Insist on full, and complete, research into potentially harmful effects on health of not only consumers but also their progeny.
4. Institute rigorous risk assessment guidelines and ensure that regulatory bodies are peopled by individuals who do not have a financial interest in the biotechnology industry.
5. Put in place a requirement that all meetings of regulatory bodies be held in public, so that reasons for decisions can be made known. This is vital because of the potential for such widespread harm in the entire environment

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