

Science *in* Society

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Organics Boom Worldwide - Corporate Takeover Begins



GM Crops Debacle Now Official - Africa Says No Thanks

Policies For Sustainable Food Systems

First Sighting Of Structured Water

Living Test For Mad Cow Disease

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GM ending for Africa?

South Africa sprang a big surprise when it slapped a moratorium on genetically modified (GM) imports at the end of October. The country has been the biotech industry's main entry-point into Africa as the industry was being driven out of Europe. South Africa has a weak biosafety regime with biotech lobbyists acting in a regulatory capacity; and is the only country on the continent that has commercialised GM crops. This puts it seriously out of step with neighbouring Lesotho, Namibia, Zimbabwe and Mozambique, which are among the dozen or so African countries that have imposed bans and restrictions on GM imports following Zambia's outright rejection of GM food aid in 2002 (S/S 16, S/S 17).

The South African government has commissioned its Department of Trade and Industry (DTI) to study the implications of GM imports on trade; and the moratorium is not likely to end before the DTI study is complete by the end of next year.

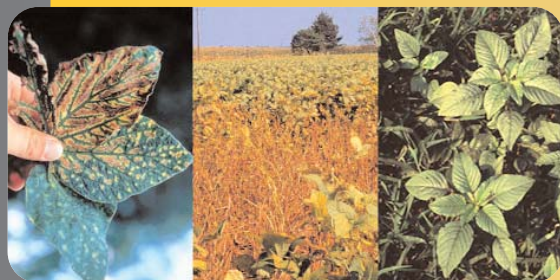
As a major food producer and exporter, South Africa is clearly worried about trade, especially in GM maize. GM maize accounts for 70 percent of maize traded on the global market. As very few countries want to import GM maize, there is a glut. So South Africa, a net maize-exporter, finds it cheaper to import GM maize from Argentina than to source it from within the country, with the result that 3.5 million tons of local non-GM maize could not be sold in 2005, leaving South African farmers devastated.

Meanwhile, Zambia is holding firm against GM food aid and imports despite projected food shortages due to drought, and amid intense pressure to accept GM crops from an international pro-GM lobby. It is opting instead for organic and other low input agriculture that are boosting yields and farm income, and most important of all, liberating farmers from decades of indebtedness and dependence on agrochemicals.

Whether intentional or not, South Africa and Zambia are both making wise moves towards food security for the same reason. High input/GM agriculture and cheap imports both depend on cheap oil, which is fast disappearing.

Petrol queues are increasingly common across the globe, and Zambia is no exception. Crude oil price keeps rising, while fuel production lags further and further behind consumption. On one occasion, I was trapped in my hotel room in Lusaka with no electricity for part of the day because the hotel has been "shedded" from the grid on a regular basis for weeks; and taxis were going nowhere because the petrol pumps were empty. Could the end of cheap oil signal the end of subsidised dumping as well as high input/GM agriculture?

If governments need more convincing to give up GM crops, they should look at the new damning scientific evidence.



Roundup Ready Sudden Death, Superweeds, Allergens...
Time to Wipe GM Crops Off the Globe P.26

Editor & Art Director:: Mae-Wan Ho
Assistant Editor: Rhea Gala
Production Editor: Julian Haffegge
Production Assistant: Andrew Watton
Publishing Consultant & Contributor: Sam Burcher

Associate Editors: Joe Cummins, Peter Saunders, Peter Bunyard

Other Contributors to this Issue:
Michael Meacher MP, Alan Simpson MP, Caroline Lucas ME, Vandana Shiva, Prof. Miguel Altieri, Prof. Walter Pengue, Mariam Mayet

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Enquiries, subscriptions and book orders contact:

Sam Burcher sam@i-sis.org.uk
tel: 44 20 8452 2729

ISIS Director:
Mae-Wan Ho m.w.ho@i-sis.org.uk
tel: 44 20 7272 5636

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GM crops debacle now complete

GM crops are industrial monocultures only far worse. Two traits account for very nearly all the GM crops grown commercially worldwide: more than 75 percent are herbicide tolerant, nearly all to the herbicide glyphosate, or Roundup, Monsanto's formulation; the rest are insect-resistant, due to a class of Bt-toxins from the soil bacterium *Bacillus thuringiensis*.

Evidence has been accumulating over the years that all is not well with both types of GM crops: yield drag, poor performance in the field, more pesticides used, reduced profit for farmers, and bad for health and biodiversity.

A spate of recent findings not only confirm what we already know, but also complete the debacle. Roundup resistant superweeds and Bt-resistant insect pests have now been documented, making both Roundup tolerant crops and Bt crops useless. The problems don't end there.

Bt crops express variable amounts of the toxins, often insufficient to kill target pests; but harm beneficial insects including predators, bees and soil decomposers. (Bt toxins are already known to be actual or potential allergens and can provoke strong immune reactions.)

Roundup herbicide causes sudden crop death. It is lethal to frogs, and highly toxic to human placental cells, even at one-tenth the recommended dosage. (It is already linked to cancers, neuro-defects and spontaneous abortions.)

That's not all. A research team led by Dr Irina Ermakova of the Russian Academy of Sciences has just reported that 36 percent of rats born to GM-soya fed mothers were severely stunted compared with 6 percent of rats born to mothers fed non GM-soya. Within three weeks, 55.6 percent of the progeny of GM-soya fed rats died; the death rate was six to eight times that of progeny from rats fed non-GM soya, or a diet without added soya. This latest is perhaps the most dramatic in a string of revelations indicating that GM food is far from safe, which have been systematically dismissed, suppressed or not followed up.

It is sheer lunacy to expand the cultivation of GM crops like these across the world, as the pro-GM lobby is pushing for. It can lead nowhere else but towards global biodevastation, massive crop failures and global famine.

Scientists and universities for rent

Unfortunately, a powerful pro-GM lobby has infiltrated every level of civil society from international aid agencies to governments, and academia; I have crossed paths with it all too often.

Monsanto and other biotech corporations have been funding university scientists to do their research cheaply, yes; but also to do propaganda and to 'debate' with scientists like me. We are defamed and libelled at public conferences, in the popular media and pages of the learned journals. This happens worldwide. In Lusaka recently, I came up against a scientist from the University of Zambia leading an aggressive disinformation campaign against his country's rejection of GM crops, and exploiting the most horrendous image of a starving African child to make his case. Following him, a scientist from Kenya used the same image and told the exact same story.

Scientists like us risk losing research grants and jobs, even those relatively high up in the academic echelon.

Fred Kirschenmann was director of the Leopold Center in Iowa State University for the past five years, until he was suddenly and involuntarily made "distinguished fellow". His sins? He argued once too often that there is an urgent need for "a more intelligent, diversified farming system." Genetic modification, he said, is "simply another tool to make the monoculture work a little longer" in the face of the pests and diseases that monocultures encourage.

For his parting shot, Kirschenmann said Iowa State's College of Agriculture "draws agribusiness cash the way a penned-up pig wallowing in its own waste draws flies."

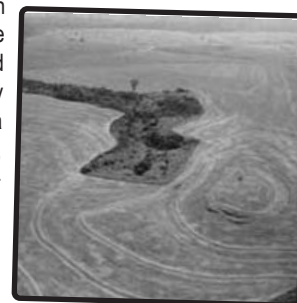
If it's any comfort, I have found it refreshing and liberating to work outside academia since I was strongly encouraged to retire early in 2000, for speaking out on the risks of genetic modification.



From the Editor

Stop GM soya in Latin America

We need look no further than Latin America for the nightmare scenario. It is being destroyed by soya cultivation, especially with the arrival of GM soya ("Argentina's GM woes", SiS20; "How Europe is recolonizing America", SiS 25). Soya is inextricably tied to the meat industry ever since agronomists discovered that adding soya to grain could improve the



feed to meat conversion ratio up to two-fold. Countries like Argentina, Brazil, Bolivia, Paraguay and Uruguay are driven to grow soya for foreign exchange, to repay foreign debt, and in response to demand from importing countries especially China, currently the world's largest importer of soybean and soybean products. Soya fields have been spreading in Latin America like an ecological canker, eating up the pampas, the savannahs and the Amazonian forests; bringing with them massive infrastructure projects for transporting and processing soybean that obliterate natural habitats far beyond the areas cleared for soya cultivation. This is happening just when the integrity of the Amazonian forests is absolutely essential for stabilizing global climate against the increasingly frequent climatic catastrophes of hurricanes, floods, droughts, and heatwaves.

It is time to wipe GM crops off the planet. Governments in Latin America should put a halt to the spread of GM soya right away and reconvert monoculture soya fields back into forests or sustainable agro-forests with the help of the international community, under the provision of the Kyoto Protocol. The rest of us can contribute by rejecting not only GM soya, but also soya-fed beef in favour of organic grass-fed beef.

Sustainable World Weekend Workshop

There is nothing to stop us independent scientists from telling the truth and making science work for a sustainable and equitable world. To do just that, we are organizing a weekend workshop with living legend Professor George Chan of "Dream farm" fame (SiS27), plus other luminaries (see backcover). Please apply early as places are strictly limited.

All SiS issues and articles can be accessed at <http://www.i-sis.org.uk/isisnews.php>



What the ISP has been doing and how you can help

Stop Monsanto-Sponsored TV Series

The Public Broadcasting Service (PBS) in the United States has long been regarded as an oasis of independence in the corporate-controlled mainstream media. But this image is now under threat as a new PBS series, "American Heartland", is poised to hit the airwaves

The US-based Union of Concerned Scientists has made the accusation that *American Heartland* "appears to unevenly promote the interests of the series' main sponsors - Monsanto and the Farm Bureau - two historic proponents of industrial-style food production." Advance material indicates that the series will give "an entirely positive portrait" of US agriculture. And despite an in-depth approach spanning 20 episodes, "the series producers appear unwilling to give time to any concerns about agribusiness, from the impact of pesticides on human health, to pollution and foodborne illness caused by industrialized meat production, to the debate over genetically engineered crops."

The series is to be distributed to more than 300 public television stations by American Public Television, the single largest provider of programming to public television stations. It will be carried on approximately 100 stations and hence available to more than 60 percent of the US' viewers in some 71 million households.

Dr. Mae-Wan Ho voiced concerns on behalf of ISIS and ISP in a letter (dated 20 August 2005) addressed to David Hosley, President and General Manager of KVIE Public Television.

In the letter, she summarised key findings against GM crops contained in the ISP Report, *The Case for a GM-Free Sustainable World*, first published in 2003:

- Regulations over the releases of GM crops and products have been highly inadequate
- There has not been a single credible independent scientific study showing that GM food and feed are safe to eat
- Existing evidence raises serious doubts over the safety of the transgenic process itself
- GM varieties are unstable; and this may enhance the unintended spread of transgenes across species barriers, with the potential for creating new viruses and bacteria that cause diseases, and to disrupt

gene function in animal and human cells

- Many GM crops contain gene products known to be harmful: Bt proteins incorporated into a wide range of GM crops to control insect pests include strong immunogens and allergens
- Herbicide tolerant GM crops - accounting for 75 percent of all GM crops worldwide - are tied to the broad-spectrum herbicides glyphosate and glufosinate ammonium, both systemic metabolic poisons linked to spontaneous abortions, birth defects and other toxicities for human beings and laboratory animals, and also harmful to wild life and beneficial organisms in the soil
- GM crops have resulted in no benefits to the environment; there has been no reduction in the use of pesticides, while herbicide tolerant weeds and volunteers have emerged, and highly toxic herbicides have had to be brought back in use.

In view of the evidence against GM crops and in favour of all forms of sustainable non-GM agriculture also reviewed in the ISP Report, the ISP has called for a global ban on further environmental releases of GM crops and a comprehensive shift to non-GM sustainable agriculture.

Since its publication, all the major findings of the ISP report have been further corroborated. Meanwhile, the shift to sustainable agriculture has become all the more urgent as industrial monoculture is showing all the signs of collapse under global warming, and water and fuel shortages. The letter ended by urging the Public Broadcasting Services to inform the public as fully as possible.

Please forward the full ISP letter (www.i-sis.org.uk/LettertoPBS.php; www.indsp.org/ISOMSD.php) to your local television station and policy-makers to prevent a potential pr exercise for GM crops and a massive disinformation campaign on behalf of agribusiness.

Support non-GM Brazil

Dr. Mae-Wan Ho delivered a letter on behalf of the ISP, dated 15 August 2005, to His Excellency, José Mauricio Bustani, Brazil's Ambassador to the UK, urging him to convey a strong message to President Lula to reverse the decision to allow cultivation of GM soya in Brazil; and instead to support reforestation of existing soya plantations for sustainable, small-scale agro-forestry that can truly provide food security for all (www.i-sis.org.uk/letterJMB.php; www.indsp.org/letterJMB.php).

Please forward the ISP letter to president Lula and other policy-makers in Brazil

Stop Terminator Seeds

Professor Joe Cummins sent a letter on behalf of the ISP to Hamdallah Zedan, the Executive Secretary of the Convention on Biological Diversity of the United Nations Environment Programme (15 September

2005) calling for a halt to Genetic Use Restriction Technologies (GURT) and other forms of engineered plant sterility ("View from MADS house" and "Terminator Trees" SiS26 2005).

These "have no place in human agriculture"; the use of which "should be outlawed". "The world should demand of the United Nations that they at last stand up for the good of the people of the world," Cummins wrote.

The letter and enclosed article can be found at <http://www.i-sis.org.uk/ISOTTs.php>; also at <http://www.indsp.org/letterHamdallahZedan.php>.

Please forward the letter and article to national delegates to the upcoming conferences of the United Nations Convention on Biological Diversity in Spain and Brazil, January 2006 (For details visit International Campaign against Terminator Technology website: www.banterminator.org).

Against Deregulation

MON88017 another MON863?

Prof. Joe Cummins and Dr. Mae-Wan Ho submitted a comment to the US Department of Agriculture, 25 August 2005, on behalf of the Independent Science Panel as they caught Monsanto trying to get a different version of an already controversial GM maize variety deregulated (<http://www.i-sis.org.uk/mon.php>).

Against Environmental Releases

GM Bacteria and GM Fungus with Antibiotic Resistance Genes

Prof. Joe Cummins submitted comments to the US Department of Agriculture, 29 August 2005, on behalf of the Independent Science Panel objecting to the field trials of GM bacterial and fungal pathogens with antibiotic resistance genes (<http://www.i-sis.org.uk/Fieldtests.php>).

Transgenic plants with antimicrobial peptides

Prof. Joe Cummins and Dr. Mae-Wan Ho lodged an objection on behalf of the ISP (19 September 2005) in support of the Niigata Prefecture citizens' legal action to halt a transgenic rice trial in Japan, and urged the general public to demand comprehensive risk assessment from the US Environmental Protection Agency (see "No to releases of transgenic plants with antimicrobial peptides", this issue).

In and For Society

Prof. Peter Saunders submitted a comment (25 August 2005) on Europe's public funding of scientific research to the European Commission on behalf of ISP, highlighting support of science for the Third World, and effective programmes for independent science and for *science in society* (see "Science in & for society", this issue).

Living Test for Mad Cow Disease



Left: Blackbirds at feedlot, USDA wildlife damage gallery. Right: No organic herd ever had BSE

A new diagnostic test that claims to detect Mad Cow Disease in living animals before symptoms appear also raises questions on the cause of the disease **Dr. Mae-Wan Ho**

Mad Cow Disease and variant CJD

It has been 20 years since Mad Cow Disease (bovine spongiform encephalopathy, BSE) appeared in Britain, killing more than 180 000 cattle, and causing the mass slaughter of a further 5 million. The disease has jumped species to human beings, resulting in some 160 known cases worldwide of the fatal variant Creutzfeldt-Jakob Disease (vCJD); although the precise extent of the CJD epidemic is suspected to be 20 times worse than appears (see Box).

The disease agent, according to the current establishment view, is a highly unusual misfolded protein, prion, which both causes and transmits the disease. Prion proteins are present in the brain tissues of all healthy animals in the correctly folded form. However, on being exposed to the misfolded form, the correctly folded normal protein becomes misfolded, causing it to aggregate into dense fibres, clogging up the cells and triggering a degenerative disease that turns the brain into a sponge.

There has been little progress in diagnosis or treatment for either BSE or vCJD. The only available tests are those done *post mortem* on brain tissue from slaughtered animals, based on detecting the misfolded prion protein that's found after the disease has progressed to a late stage. This not only underestimates the cases of BSE, but can also allow infected cattle to pass into the human food chain. A tiny amount of misfolded prion protein may be sufficient to make a healthy animal's own correctly folded prion protein to misfold.

Several laboratories have been trying to develop a test for diagnosing BSE in live animals before the disease symptoms appear; nearly all based on improving the sensitivity of detecting prion proteins.

Living test depends on specific genetic markers

In July 2005, a company in Gottingen, Germany, published a peer-review paper in the journal, *Clinical and Diagnostic Laboratory Immunology*, reporting a diagnostic test for BSE in live animals, which does not depend on detecting the prion protein. Instead, the "Gottingen Living Test (GLT)", as it is called, depends on detecting "unique, specific gene markers" that are in 100 percent of cows with confirmed BSE, and in 100 percent of groups of associated high-risk animals, i.e., cows in the same feeding cohorts as those with BSE. In contrast, only 0.6 percent of the control group of healthy animals tested positive on the GLT. This suggests that the test could be used to identify animals that are at risk of developing BSE, in BSE eradication and surveillance programmes. The GLT will enable ani-

mals at risk to be removed from the food chain while still alive, thereby reducing both the threat to human health and the economic impact on the cattle industry.

Circulating nucleic acids and chronic diseases

The development of the GLT involved collaboration between the Institute of Veterinary Medicine at Georg-August University, Gottingen, a leading research institute for BSE, and Chronix Biomedical, a genomics company whose core technology - protected by patent - is based on developing tests for detecting and monitoring a new class of markers for chronic illnesses: circulating nucleic acids (CNAs).

CNAs are RNA and DNA detected in biological fluids free of cells or cellular material and found to be useful for the staging of some chronic illnesses. Most CNA lab diagnostics are based on amplifying either RNA or DNA with primers (probes) for single-copy functional coding regions of genes associated with infectious agents such as West Nile virus, HIV, or hepatitis B virus.

In contrast, some CNA studies have focussed on endogenous repeat sequences found in the genome. Dr. Howard Urnovitz, the CEO of Chronix Biomedical, found three out of three sick veterans of the 1991 Gulf War had the same repetitive sequences, including short *Alu* repetitive sequences in their CNAs ("Dynamic

genomics & environmental health", SiS 19). Similarly, repetitive sequences in CNAs were associated with the clinical status of individual multiple myeloma patients.

BSE diagnosis in sick cows and healthy BSE-exposed cows

For BSE diagnosis, a specific polymerase chain reaction (PCR) probe was used that amplified the tail-end of a bovine genome short interspersed nuclear element (SINE), *Bov-tA*, about 285 000 copies of which are present in the genome, often at the 3'(tail-end) untranslated region of genes. The probe detected multiple CNAs, ranging from less than 150 to 350bp, found only in the sera of BSE-confirmed cows and among high-risk cows exposed to BSE in the same feeding cohorts. None of the bands was amplified from the sera of healthy control animals.

The PCR products from two BSE cases and six BSE cohort animals were cloned and sequenced. The range of fragment sizes was from 105 to 304bp, with an average size of 210bp. A stretch of about 80bp - found in nearly all the clones (150 out of 163) - was part of *Bov-tA*, as expected.

The "Gottingen Living Test (GLT)" depends on detecting "unique, specific gene markers" that are in 100 percent of cows with confirmed BSE, and in 100 percent of groups of associated high-risk animals