MAIL-OUTS „No Control on Life!“ 1999

(Monthly mail-out by Florianne Koechlin, European Coordination ‘No patents on life!’, Blue Ridge Institute)

MAIL - OUT 72 (November, 1999)

No control on life

This mail-out is written by Robin Jenkins. He presented the ‘Bt-story’ at the Genet-meeting in Madrid on October 24 and 25. (It’s the summary of a study he is about to finish). Robin Jenkins is organic farmer in Southern France and board-member of Genet.

The Bt Story

Bt, short for Bacillus thuringiensis, is a bacteria that exists naturally in the soil of every continent. A world wide survey carried out in 1987 found some 72 new varieties of Bt, making a total of 96 known varieties (1).

When ingested, Bt is lethal to the grubs of a number of butterflies, moths, beetles and other insects, including mosquitos. However, the natural history and the ecological role of Bt both remain much of a mystery. Despite our ignorance, we can reliably assume that Bt in its natural form kills a certain proportion of susceptible insect grubs and larvae. Equally, we can reliably assume that a proportion of the susceptible species is naturally resistant to Bt. However, it is not known how important Bt is to the stability of natural ecosystems, or to what extent natural ecosystems would be destabilised if Bt ceased to be lethal to the susceptible species.

Bt sprays became part of the organic repertoire for pest control in the 1960s and have been used as and when necessary against the insect pests of many vegetables and fruits in most parts of the world. The Bt sprays that were commercially available at this time typically contained unidentified and different Bt varieties, giving unpredictable results. The main limitation with Bt sprays was their inability to tackle insects that bore inside plants, and its short biological efficacity (3-5 days).

More recently, agribusiness has become interested in Bt because the insects it kills happen to include a number of pests that have been inadvertently globalised by monocultures, including the colorado potato beetle (2), the european maize borer (3) the cotton bollworm (4) also known as the corn ear worm, the pink bollworm (5) and the tobacco budworm (6). Having run out of cost-effective chemical weapons in their self-styled war against these pests during the 1980s, the agrochemical industry turned to what they termed ‘the wonder biopesticide’. Bt was cheaper to develop and manufacture than chemical pesticides and the agrochemical industry also hoped that it might give them a much-needed ‘green’ image. Most of the large companies in the sector invested in Bt (7). They isolated a number of Bt varieties, tested their toxicity on commercially damaging pests and sold the products under a confusing variety of trade names (8). By the early 1990s Bt sprays were being used on over 800,000 hectares of field crops in the USA alone. Six crops were largely dependent on Bt, with over 80% of planted areas being sprayed in some states (9).

Evidence of the problems to come was already available in 1979, when the first laboratory study showed that insects could develop resistance to Bt as a result of persistent contact (10). By the mid 1980s various entomologists had managed to breed insects which were up to 15,000 times more resistant to Bt than the natural populations. The agrochemical industry set up its own study group on insect resistance to Bt, which played the dual role of encouraging funds towards the research questions that were compatible with their interests, whilst giving the research results whatever spin was required to maintain a carefully massaged ‘scientific’ consensus and the impression that the problem was under control. In fact it took the agrochemical industry less than 10 years to put Bt on the pesticide treadmill.

By 1990 the diamondback moth had developed resistance to Bt in the field (11). As a result, the research focus then shifted to what the industry and the regulatory authorities called 'resistance management strategies'. Initial optimism within the industry was based on a study showing that insects resistant to one Bt strain were still susceptible to other Bt strains (12), but this gave way to pessimism when further laboratory studies showed that insects resistant to one Bt strain could develop resistance to other Bt strains with which they had never even had any previous contact (13). The so-called 'resistance management strategies' turned out to be 'resistance delaying tactics' (14). In 1994, American entomologist Bruce Tabashnik warned that 'theoretically one could use Bt extensively, perhaps in combinations or high doses, and somehow avoid resistance, but virtually no experimental evidence supports these approaches. Because intensive use of Bt could potentially produce rapid and widespread resistance, the burden of proof rests heavily on those who advocate attempts to overwhelm pests with Bt. ..... The surest way to conserve the efficacy of Bt is to use it judiciously in conjunction with other controls'(15).

It was within this rapidly deteriorating situation that Monsanto, Novartis, deKalb and Mycogen decided to launch the high risk strategy of engineering Bt genes into plants so that the whole plant became poisonous to susceptible insects. According to the industry, there would be no more need for farmers to spray their fields and even the insects that bore inside plants would no longer be safe. Bt potatoes, maize and cotton were first sold for commercial use in the USA in 1996. Monsanto had (and still has) a global monopoly of Bt cotton and Bt potatoes, but the Bt maize market is characterised by fierce competition between Monsanto, Novartis and DeKalb, each of which needed to negotiate joint development deals with plant breeding companies such as Pioneer, Delta Pine, and Northrup King in order to get acccess to registered and patented maize varieties that could then be engineered. This resulted in the marketing of Bt 176 and Bt 11 by Novartis, of MON 801 and MON 810 by Monsanto and of DBT 418 by DeKalb.

Entomologists are agreed that Bt plants are much more likely to result in Bt resistant insects than Bt sprays (16). Faced with the fact that the widespread marketing of Bt crops would inevitably foreshorten its life as a biologically useful bioinsecticide, the industry started to consider military rather than economic options. Throughout 1995 the US agrochemical industry, entomologists and cotton farmers seriously discussed the possibility of totally eradicating the pink bollworm using Bt cotton (17). The strategy was eventually deemed too risky and attention returned to resistance delaying tactics.

The US classifies Bt crops as pesticides so they fall under the terms of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and are dealt with by the Environmental Protection Agency (EPA) in Washington. As early as 1987 the EPA sponsored a conference on the questions raised by Bt plants. In November 1994 the EPA stated that it had 'begun to analyse the regulatory and non-regulatory tools it could use to address resistance to all pesticides, including plant pesticides'. In January 1998 the EPA published a white paper on Bt plant pesticide resistance management. By then the EPA had been forced to consider the complexities of cross resistance between Bt cotton and Bt maize. Cotton monocultures are decimated by three pests in the USA, whilst maize can be decimated by five pests. One pest - Helicoverpa zea - attacks both cotton and maize. This led the EPA to ignore free market economics and limit the sale of the Novartis Bt 11and the Monsanto 810 to 40,000 hectares each across the cotton belt, and to ban the DeKalb 418 maize from the cotton belt altogether. Meanwhile the Novartis Bt 176 was allowed a free run of the cotton belt because neither the silk nor the kernel are capable of producing more than a tiny trace of Bt toxin (18). However, this deficiency is precisely the reason why the Bt 176 fails to control the second generation european corn borers and thus negates the EPA policy for delaying insect resistance. (19) In other words, the EPA only permits the sale of the Novartis Bt 176 in the cotton belt because it does not work!

The EPA, the agrochemical industry and academic entomologists currently believe that the best chance of delaying the onset of insect resistance to Bt plants is to grow highly toxic plants alongside suitable insect refuges of non Bt plants. The Bt-plant should express high concentrations of Bt-toxin in all plant parts to kill as many grubs as possible, while in refuges of non-Bt-plants the non-resistent grubs can propagate. For some years, almost all research has focussed on the size of the refuges and the problems when Bt cotton and Bt maize are grown in the same locality (20) . Entomologists favour large refuges whilst the industry wants to keep them as small as possible. Meanwhile, recently published research is showing that the EPA policy is probably wishful thinking. It seems that the grubs that are resistant to Bt crops are sexually retarded and are thus less likely to mate with non-resistant insects than the resistance management plans call for (21). The EPA licensed Bt cotton until 1st January 2001 and Bt maize until 1st April 2001. (Monsanto got a special deal for its Bt potatoes, with no lkicensing

limit.) Renewal of these licenses is conditional upon the companies completing a comprehensive programme of research on resistance management (22).

Of all the Bt crops now developed, only the Novartis Bt 176 maize has been legally commercialised in Europe. In 1998 some 24,000 hectares were grown, mainly in Spain but also in France and Germany. In 1999 a slightly smaller area was grown in Spain and Portugal. Thirteen of the 15 EU Member States opposed the commercialisation of Bt 176 but the European Commission used a loophole in the regulations to allow Novartis to sell the seed. This high-handed action back-fired because it set the political scene for the current moratorium, which effectively prevents any further Bt crops from being commercialised in the EU - for the time being. The European Commission is singularly incapable of regulating the use of Bt because Bt sprays come under the Pesticide Directive whilst Bt plants come under the Deliberate Release of GMOs Directive (1990/220). Bt is dealt with by different bureaucrats in different bureaucracies, depending on the way it is used. It is not surprising, therefore, that the EC has so far failed to develop any coherent policy for the use of Bt crops. Meanwhile, Novartis remains free to sell its Bt 176 throughout the EU, despite the US evidence that it does not work. Worse, according to the refuge-strategies it is the worst variety of all because of the low and only partial expression of the Bt-toxin. This enhances the risk of insects getting resistent to Bt - not only against the transgenic Bt-plants but also against the conventional Bt-sprays, which are amongst the most important insecticides, also in organic farming. But Novartis is actually using these deficiencies of Bt 176 as a positive marketing ploy in Spain.... (23)

(1) Morrison.J ‘Soil yields 72 new varieties of a natural pest control’ in Agricultural Research Vol 14 1988
(2) Leptinotarsa decemlineata
(3) Ostrinia nubilalis
(4) Helicoverpa zea
(5) Pectinophora gossypiella
(6) Heliothis virescens
(7) Abbott Laboratories, American Cyanamid, BASF, Caffaro, CGI Corp, Ecogen, DeKalb, ICI (Zeneca), Mycogen, Novo Nordisk, Rohm&Haas, Sandoz (Novartis)
(8) Bt aizawai, marketed for the control of caterpillars as Certan by Sandoz, Florbac by NovoNordisk and XenTari by Abbott
Bt israelensis, marketed for the control of mosquitoe and blackfly larvae as Bactimos or Skeetal by NovoNordisk, as Bactis by Caffaro, as Gnatrol or Vectobac by Abbott, as Teknar by Sandoz (Novartis)
Bt kurstaki , marketed for the control of caterpillars and colorado beetle larvae under 19 different trade names by NovoNordisk, Sandoz, Ecogen, Abbott, Roussel-Uclaf, Intrachem
Bt tenebrionis, marketted for the control of colorado beetles as Novodor by NovoNordisk
(9) Mellon.M & Rissler.J ‘Now or Never - serious plans to save a natural pest control’ Union of Concerned Scientists, Washington 1998
They cite the following use of Bt sprays: in California, 92% of artichokes, 100% of collards, 80% of aubergines, in Florida 100% of celery, 82% of cabbages, in Virginia and New Jersey, 66% of cabbages, in Washington State 62% of raspberries etc etc.
(10) Kinsinger.R ‘Susceptibility of populations of Indian Meal Moth and Almond Moth to Bt’ in J of Economic Entomology Vol 72 pp346-349
(11) Tabashnik.B ‘Field development of resistance to Bt in diamondback moth’ in J of Economic Enbtomology Vol 83 pp1671-76 1990
(12) Ferre.J ‘Resistance to the Bt bioinsecticide4 in a field population of Diamondback Moths’ in Proceedings Nat Academy of Sciences Vol 88 pp 5119-231991
(13) Gould.F ‘Broad spectrum resistance to Bt toxins in the Bollworm’ in Procedings Nat Academy of Science Vol 89 pp 7986-90 1992
(14) Gould.F ‘ Insect resistance to Bt toxins - can it be delayed?’ in Proceedings of the 2nd Canberra Bt Meeting, Australia 1993
(15) Tabashnik.B ‘Evolution of resistance to Bt’ in Annual Review of Entomology Vol 39 pp 47-79 1994
(16) Position Statement on Bt Crops by the Entomological Society of America 1995
(17) Watson.T ‘Pink Bollworm eradication through Bt’ private letter to Lavis.R dated 20.9.1995
(18) Environment Protection Agency ‘ White paper on Bt Plant Pesticide Resistance Management’ (p.46) 14.1.1998 Washington
(19) Environment Protection Agency ‘ White paper on Bt Plant Pesticide Resistance Management’ (pp.25-26) 14.1.1998 Washington ‘Because some hatching larvae initially

colonise ears to feed on silks and developing kernels, these larvae survive on 176 and may tunnel later in stalks and ear shanks'(p.25) The white paper quotes entomologist Fred Gould..... '176 line of Bt maize does not produce a high enough dose to be considered as part of a resistance management programme for the european corn borer which requires a high dose in the plant during the period when second generation larvae are present (p.26).
(20)Jenkins.R 'The Socio-economic implications of Bt biopesticides' pp 79-80 Project Bio4 2363, DGXII European Commission, 1999
(21) Liu.Y, Tabashnik.B et alia Development timing of the pink bollworm affected by Bt cotton in Nature Vol 400 p.519 1999
(22) The research required by the EPA includes target pest biology and behaviour, secondary pest biology and behaviour, population dynamics of the pests, cross-resisrtance potential, refuge strategies, dose deployment adequacy, disciminating concentrations of toxins, monitoring methods and reporting methods for resistance. EPA White Paper see (18) above
(23) The Novartis Bt 176 maize is marketed in Spain as Compa CB. The advertising leaflet reads: 'Compa Cb esta protegido durante el tiempo que el taladro es peligroso, mientras la planta esta verde. Cuando el taladro ya no es perjudicial, el gen de proteccion deja de actuar' (The Bt maize is protected from the corn borer when it is most dangerous, whilst the plant is green. When the corn borer is no longer harmful, the protective gene ceases to act.)

MAIL - OUT 71 **(October, 1999)**

Dear friends

The „Deutsche Bank“ (Europe’s biggest bank) gives the advice to the shareholders: “GMOs are dead“. Hands off. (www.biotech.info.net/Deutsche.html , see also mail-out 70). A GE-free agriculture is becoming a very interesting economic chance. It could produce and export what everybody is looking for: natural and GE-free food (and feed). The question is: Can agriculture afford to stay GE-free to solve all its problems (in a sustainable way)?

This was the starting point of a study published on October 12th , 1999: **‘Future model Switzerland (Europe) - an agriculture without genetic engineering?’** (www.biogene.org, in german language). It’s a cooperation of the Research Institute for eco-agriculture (CH, Urs Niggli), of the Eco-Institute (D, Beatrix Tappeser) and the Blueridge Institute (CH, Florianne Koechlin). We looked closely at the 6 crops potatoe, wheat, rape-seed, maize, salad and grape. We first asked: What are the key-problems , and then: what are the answers? For each crop we listed the 15 -30 mainproblems and compared the answers given by genetic engineering with those given by ecofarming and modern research in this field. Here a summary:

The problems are known - what are the answers?

The answers of **genetic engineering** and the keyproblems of the Swiss agriculture are mostly not the same. Genetic engineering does not address the key-problems. Over 70% of all deliberate releases are herbicide-resistent plants. But of all 6 crops the weed-problem only really matters in maize. In all others: potatoes, wheat, rape-seed, salad and grape weed is not a main problem. And for maize a well established methods of eco-farming to contol the weed are existing.
For most of the key-problems in European (in Swiss) agriculture , such as cereal eyespot and the septoria diseases in wheat, grey mould in grape, harmfull insects in rape-seed and the various aggressive mildew-fungus in grape, potatoe, wheat or salad there are no or no praxis-relevant answers coming from genetic engineering.
Strategies of **eco-farming**, on the other hand, start with the problem itself, although in most cases not as an isolated single factor but as an interdisciplinary system, where prevention plays a key-role. Some of these strategies are:
Good crop-management (eg locally adapted cultivation, diverse crop-rotation-systems, enhancing soil- fertility and beneficial insect-populations etc).
Conventional resistence breeding. Support by genetic-marker-methods seems a possibility for enhancement.
Search for „antagonists“ (ennemies of the pathogens). E.g.: In Switzerland most farmers fight the cornborer with trichogramma-whasps (natural ennemies of the cornborer). In rape-seed different whasps, nematodes and protozoas are important parasites against harmfull insects. In salad trichoderma-fungi showed good results against different fungi. Etc.
Early warning systems: The knowledge of the biology and dispersal of pathogens, together with climate factors such as temperature, moisture and amount of rain are fed into mathematical modells to forsee the most probable time of attack. Farmers can then be warned. In Switzerland early warning systems are commercially established in grape, fruit-trees, wheat and potatoes.
Variety-mixtures can significally enhance the stability of yield over the years (a fact many Third World farmers know for a long time: if you have drought-resistent, more insect-resistent and an early blossoming varieties together, the chance of a secured crop increases ; now the avantage of such mixtures can be shown experimentally and thus „scientifically“). Eg: When mixed with the varieties Charlotte and Claustar the late-blight-susceptible potatoe Bintje becomes 30 -50% more resistent to late blight.
Induced resistence: another exciting field of eco-research: When harmfull bugs attack plants, the plants start to „kick on“ their self-defense-strategies. For example, they start producing toxic proteins against the invaders. This self-diffense can be induced not only by the pathogen itself but by certain chemicals (e.g. salycil-acid, the main-compound in aspirin).

Do (intrinsic) limits exist?

Mildew-pathogens are very dynamic and fastly adopting to new plant-resistences. For grape (powdery and downy mildew), potatoe (late blight) and salad they are the key-problems. A milstem resistent plant contains a great number of different partial-resistences. The variety of all these resistences together accounts for the fact that mildew cannot break through and adapt to the plant. The **isolated use of one resistence-factor through genetic engineering (so called silver-bullet approach)** appears to be a dead-end strategy. Worse: The linear genetic approach could help create new mildew-pathogens which could break through the multiple resistences of other plants as well. The **„mosaic-approach" of eco-farming,** bringing together all the above mentioned strategies in a holistic way, is more promising. Eg: Experiments to fight mildew with 'induced resistence' showed good results for salad, potatoes and grapes. Mildews are still a big problem, and much research in this direction is needed. It's time that the focus of financing programms shifts from genetic engineering to good (and also high-tech) research in eco-farming.

GE-free agriculture - a great chance!

GE-strategies are not sustainable. They „cement" a problematic high-tech agriculture based on monocultures. They contain long-lasting, unpredictable risks (such as genetic pollution, detrimental effects on 'non-target-organisms', unexpected position-effects, new antibiotic-resistences, allergies etc.). The fact that transgenic plants can be patented whereas conventionally bred plants cannot, creates new monopolies and new dependencies - a contradiction to the principle of sustainability.
Eco-farming, together with farming of 'Integrated Production'offers an excellent chance for the hampered European/Swiss agriculture re ecological, economic and social criterias.

„Zukunftsmodell Schweiz - eine Landwirtschaft ohne Gentechnik?". 118 pages, editor: Florianne Koechlin. You can get it from: FiBL, Postfach, CH - 5070 or: karin.nowack@fibl.ch . You'll find it also under : www.biogene.org

MAIL - OUT 70 (September, 1999)

Dear friends

Many of you might have read it already: **The analysis report of the 'Deutsche Bank': „Thanks. But No Thanks?"[1]: http://www.biotech-info.net/Deutsche.html**.
The reason I bring it here: I think this report marks a new quality, a new quantum leap in the worldwide resistence against genetically manipulated organisms (GMOs). A report written for shareholders who's main-interest is if they have invested their money in the wrong place or not, gives a thumb down to the financial prospects for life science companies that have invested heavily in seed industry mergers and genetic engineering in agriculture. I remember that in the struggle against nuclear plants (in Switzerland) it was the historic turning point when ECONOMIC interests began to turn against the nuclear option.
So here some citations, but a carefull reading of the whole analysis is well worth the time! And a strong economic argument for going for many „gentech-free zones", all over Europe, all over the world.

A US-team of the 'Deutsche Banc Alex.Brown', not at all being against the option of GMOs, remarks that „the growing negative sentiments toward GMOs creates problems for Pioneer Hi-Bred, Monsanto, Delta & Pine Land, Novartis and, the a lesser extent, Dow." „In our perception wars are being lost by industry, one battle after the other, and there is little on the near-term horizon likely to replicate General Pickett's Charge in favor of industry". The analysis focuses on the US-market. They remark: "In the US, the GMO debate would have occurred earlier this decade had the FDA opened the question for debate." But the FDA decided (contrary to Europe) not to label GMOs. „While the science behind GMOs is one thing, we believe the lack of public discourse back then should lead to more heightened scrunity when it does come. According to a recent IFIC poll, almost half of Americans think their food are 100% free of biotechnology, when in reality, almost 60% of processed food already contains GM products (...). This disconnect between perception and reality cannot be good for industry when the forum for debate reopens."

The report dwelves on the possible risks of GMOs, warns about putting all the European scrunities away too easily, and then talks about „a bifurcated market developing with a PREMIUM being placed on non-GMO crops rather than the hoped for premium on GMO crops. Infall of 1998, Consolidated Grain &Barge offered a 2 cents/bu premium for non-GMO corn, while others offered a 5 cents/bu premium. Archer Daniels Midland, one of the biggest grainmerchants, is paying this year an 18cents/bu. premium for non-GM soja. And „The U.K. Farmer's Weekly recently had an estimate from seed dealers suggesting that up to 20% of GM corn seed was returned to distributors by farmers this year." As they point out, there is also a US-competition with Brazil, where no transgenic crops are grown this year for commercial use (although there may be illegal contaminations with GMOs).

And furthermore: Life Science groups face lawsuits

(From Financial Times, Jean Eaglesham, 13/9/ 1999)
„The huge antitrust lawsuit against life science companies such as Monsanto, DuPont and Novartis to be launched later this year will catapult the issue of genetically modified (GM) crops back into public debate.The lawsuit should throw fresh light on competition policy in sectors where each company's market share is inextricably linked to its intellectual property. Unlike conventional markets, where goods are bought and sold, GM crops are patented, with seeds leased to farmers on an annual basis. These patent rights are fiercely protected. In the US, where GM crops are widely used, farmers have to give a legally binding undertaking they will not save and replant the seeds." And: „Campaigners worry about the control this market structure gives the life science companies, particularely in poor countries where nine out of ten people may depend on farming for survival. Traditionally, about 80% of farmers in the developing world have saved and exchanged seeds. Will replacing this model with a system for leasing (patenting, FK) seeds leave such farmers vulnerable to exploitation?"The law suit is being brought jointly

[1] the 26-pages report analyzes the the Dupont-Pioneer merger.

by the Foundation on Economic Trends (around Jeremy Rifkin) and the US based National Family Farm Coalition, together with individual farmers across Latin America, Asia, Europe and North America.

MAIL - OUT 69 (August, 1999)

Dear friends

You'll find the name of future mail-outs changed to "No control on life!", in order to broaden the scope. But this mail-out is focusing on patents once more:

Animals and plants patentable - radical change of the law by EPO

On September 1st ,1999, transgenic animals and plants, and also human cells and genes, shall be patentable in Europe - such the decision the Administrative Council of the European Patent Office (EPO) took on June 16th. With this decision the Administrative Council anticipated a change of the European Patent Convention (EPC, equals European patent-law) of uttermost importance, in all secrecy and bypassing democratic authorities. By making a revision of the Implementing Regulations to the European Patent Convention, they bypassed a revision of the EPC itself (which only a Diplomatic Conference of all EPC-members can decide).

Background:

According to the European Patent Convention the most important requirement for granting a patent is that it's an "invention" (and not just a "discovery"), which can be fully described and which can be rebuilt by a skilled person. But living beings cannot be "invented", cannot be exactly described nor rebuilt - this is the fundamental and beautifull difference between a living being and dead material. The EPC also contains clear exception-rules from patentability: Art 53 b for example states, that "plant- and animal-varieties" cannot be patented.

1992 the EPO granted the first patent on a living animal - the famous oncomouse. Organised by "No patents on life!" over 200 NGOs from all over Europe opposed this patent. Beside the main arguments of ethical and social concerns we opposed to the fact that the patent contained all transgenic "non-human mammals" (be it cancer-dogs or cancer-giraffes), in order to circumvent the patent ban on animal-species....The 3-days lasting proceedings in 1995, which ended with an eclat, also clearly demonstrated the fact that it is nearly impossible - with all legal tricks - to redefine an animal into a patentable "invention". Up to today there is no decision on this case.

1997 the Technical Board of the EPO gave a negative oppinion on a plant-patent from Novartis because of similar reasons: The granting of such broad patents should be considered as if you could conclude from a law for a ban on bigamy that poligamy is allowed.... A final decision of the Enlarged Board of the EPO (the highest authority) on this crucial issue is expected for the beginning of 2000.

In the mean-time the Administrative Council of the EPO launched its coup de main and redefined the EPC with a revision of the Implementing Regulations of the EPC. 2 examples:

- "Biotechnological inventions shall also be patentable if they concern: (b) plants and animals if the technical feasability of the invention is not confined to a particular plant or animal variety".
  This means: Transgenic plants and animals shall patentable, without limits. Already today every patent-proposal is formulated in such a way as to include many varieties. The patent on the transgenic soja from Monsanto e.g. includes also transgenic "wheat, rice, cotton, sugarbeet, rapeseed, flax, sunflower, potatoe, tobacco, alfalfa, poplar, pinapple, apple and grape" (claim 28, patent No EP 546 090).
- "An element isolated from the human body (...), including the sequence or partial sequence of a gene, may constitute a patentable invention, even if the structure of that element is identical to that of a natural element". This means: Just the isolation of a human gene gives its "inventor" exclusive monopoly-controll and rights over its patented "invention".

A change of the EPC-law of this dimmension would have required at least a revision of the EPC itself (and not just the implementing regulations). Such a change can only be done by a Diplomatic Conference of all member States in an unanimous vote. This would have meant a democratic - and public- debate and decision-taking.

Instead the Adminitsrative Council seems to be redefining the EPC by a revision of the implementing regulations, in a closed circle and screened off the public, arguing that it's merely a question of implementing existing definitions, with no major changes involved. If this circumvention of democratic authorities is permissable has yet to be seen.

The Administrative Council rests its arguments on the controversial EU-Patent-Directive, which was adopted by the European Parliament in 1998 (see mail-out 59). But this EU-Patent-Directive is being opposed at the European Court of Justice by 3 states: by the governements of The Netherlands, Italy and Norway (see mail-outs 62 and 67). Their main arguments: The EU-Patent-Directive contradicts the EPC, as well as the Convention of Biodiversity. It also contradicts the principles of human dignity by permitting patents on "isolated" human elements. The decision of the European High Court is yet to come.

MAIL - OUT 68 (June, 1999)

Dear friends

Please let me know if you prefer receiving this mail-out on e-mail. A short notice to: fkoechlin@datacomm.ch will be enough.

Gentech-food is out. Burger King Portugal announced the abandonnment of GMfood, even in Ketchup and Mayonnaise, and so did 10 of the biggest European supermarket-chains and many others. So it's not only the "exclusive" ecocorner, but mass-production as well going GM-free - a great chance, and time for us to rethink our strategies. In Basel, CH we celebrated end of May the "feast of all senses - the pleasures of eating, genetechfree". This event got an overwhelming and surprising press-coverage all over Switzerland, in TV, radio and print-media. Why?

Up to now our campaigns mainly aimed at the negative, at warnings of the new risks, be it for humans or for the environment. Up to now it was mainly industry's agenda we had to react upon; now it's time for our own agenda, in an offensive way, and in a broader scope. Last year we (NGOs in CH) tried to strengthen the bridge between the No (to GM-food) and the Yes (to organic food), with new coalitions between the organic and the antigentech-movement, between organic research and GMO-risk-research.

But let's go a step further: We now need new forms of resistence, on a plattform of enjoying life and good food: We say Yes to delightfull eating, to enjoying life , and **therefore** we say No to gentech-food. This sounds simple enough, but in the end this encompasses nothing less than a cultural change (the "de-genetification of our culture").

At the "Feast of all senses" Simonetta Sommaruga (from a Swiss consumer-NGO) pointed out that the image of genetech-food may also be that bad because it comes at a wrong moment in history: For a long time organic food was connected with the image of being healthy, rather special, for eco-freaks in handknitted pullovers only, and it needed much conviction to buy a shrivelled apple for double prize. But things changed. Today (in CH) you can buy organic food in every supermarket, and it tastes great (did you ever taste the difference between an organic asparagus and a normal one?). You can also buy your good conscience with it: Organic food not only tastes good, it also has a peacefull history of good quality. Organic food is becoming the modern, healthy option of tomorrow.

Genetech-food is another story. Consumers got chased around in the last years by BSE-, hormon- , dioxine- and unapproved gentech-food-scandals, and they may become sick of it. Gentech-food, with its taste of manipulation and power-misuse, may already be yesterdays option, outmoded even before it got off.

Again: This cultural change seems easy enough, but I dare say this will also be an enormous step for all of us who fight gentech-food; because, looking around among ourselves I see lots of workoholics and not so many bon viveurs and life-enjoying gourmets... but can we advocate a good life, delightfull and genetechfree eating, without living it too (to some extent at least)?

The "Feast of all senses - the pleasures of eating, genetech-free" was a first attempt in this direction: A 7-course dinner "organic gourmet" was served embedded in music- and theater-happenings, with "Song books" by John Cage , with Swiss folklore music and - before dessert - with a drink "Natural Viagra" (an Ayurvedic drink from Sri Lanka) - and so on, a feast of all senses... Afterwards the "Declaration of al senses - the pleasures of eating, genetechfree" was launched on the Rhine, with music, fire and water, while a Swiss cook, a German farmer and a French wine-producer said a few words. Some of the most famous Swiss cooks and gourmet-critics already signed this declaration: the launching of a broad movement "good eating, genetechfree". A one-day-seminar on this topic provided the political imputs.

MAIL - OUT 67 (May, 1999)

Dear friends

For all those who gave me notice they'd prefer the mail-out on e-mail: Sorry for getting it (the last time!) by snail-mail; for all others who also wish to get it on e-mail: please give me a short e-mail: fkoechlin@datacomm.ch

This mail-out concentrates - once again - on patent-controversies, around the globe:

EU-patent-directive

3 countries are challenging this controversial directive adopted by the EU-Parliament in June 1998 (allowing the patenting of plants, animals and human parts, eg genes, cells, tissues):
The Netherlands were the first ones (see mail-out 62)
Italy joined their opposition in January, after an excellent campaign of our friends from the Italian Scientific Antivivisection Committe (together with other NGOs). They launched among other things , in the presence of Dario Fo, Nobel Prize Winner in literature, the "Manifesto for the protection of our genetic heritage". (Info: info@antivivisezione.it)
Norway was the third one to oppose the Directive, concentrating mainly on the argument, that this directive is in conflict with the Convention of Biodiversity. The Norwegian Forum for Environment and Development (an umbrella NGO with 67 member organisations, among others environmental NGOs, farmers organisations, Solidarity NGOs, patient- and religious-groups) has taken the - very successful! - initiative to make the Norwegian Parliament refuse the patent-directive. (Info: forum@online.no).
Bad news comes from **Switzerland** though: The Parliament passed in April a motion requesting an adoption of the Swiss patent-law to the patent-directive - without any discussion and even though Switzerland is not member of the EU. When Governement will present a proposition (probably end of 1999) we'll have to become very active.

European Patent Office (EPO)

The Enlarged Board - the highest decision-making body of the EPO -. still did not make its principal decision of whether plants and animals are patentable or not. (They gave some very critical comments on this some time ago; saying that it is contradictory to the core of the patent-law, if plant- and animal-varieties cannot be patented (Art. 53), but all plants and all animals can. This is like putting a ban on bigamy but allowing poligamy). Meanwhile patents on plants and on animals are still granted, despite of the vacuum-situation.
German activists ('No patents on life', Germany and others) filed **opposition to patent no EP 0771 874 B1 'Transgenic protein production "** ('production' of transgenic animals producing pharmaceuticals in their milk).
The **patent on baby-blood**, which was opposed by many NGOs and also by medical organisations, will be debated in the EPO in June.

TRIPS// WTO

"The US and EU appear to be attempting at the WTO to prevent a mandated review of the provisions of the TRIPS (Trade Related Intellectual Property System) in Art. 27.3(b) on patentability of plants and animal varieties, and micro-organisms and life forms, and instead restrict the review to one of implementation. The US and EC views were presented at the meeting of the TRIPs Council (21 and 22 April), but was strongly contested by a number of developing countries including India, the Philippines, Pakistan, Brazil, Malaysia, Egypt and Venezuela, trade diplomats said. The issue is to be taken up again at the next meeting of the TRIPs Council in July. (...) Art. 27.3 provides: "Members may also exclude from patentability: (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals; (b) plants and animals, other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and micro-biological processes. However, Members shall

provide for the protection of plant varieties either by patents or by an **effective sui generis system** or by any combination thereof." (from: Chakravarthi Raghavan, Geneva).

And another case of bio-piracy:

US patent No 5,751, covers the plant Ayahuasca, which is also known as Yage.It was granted to Loren Miller, director of International Plant Medicine Corporation, a small California-based company. Indigenous leaders from the Amazon rain forest want the US government to revoke this patent for the Ayahuasca, which is used in sacred ceremonies by indigenous people in Brazil, Ecuador, Peru and Colombia. "The indigenous peoples of the Amazon basin believe that commercializing an ingredient of our religious and healing ceremonies is a profound affront to the more than 400 cultures that populate the Amazon basin," said Antonio Jacanamijoy, the general coordinator of COICA. "According to tradition, only shamans are authorized to prepare the ceremonial drink made from the sacred plant, and no member of the community can drink it without the guidance of a shaman," he told reporters. (IPS News Bulletin, 31.3.99)

More about patents:

BIO-IPR is an irregular listserver on patents, biodiversity and associated knowledge, issued by GRAIN: bio ipr request@cuenet.com (further info on GRAIN: http://www.grain.org)
Some excellent journals on patents, issued by GRAIN and Gaia (GB) (to order: GRAIN, fax: (43) 93 301.16.27; email: grain@bcn.servicom.es):

- "Global Trade and Biodiversity in Conflict (TRIPS versus CBD)"
- "biopiracy: licence to plunder (A breifing on how Intellectual Property Rights erode traditional knowledge systems)
- "Patenting, Piracy and perverted Promises. (Patenting life: the last assault on the commons)

MAIL - OUT 66 (April, 1999)

Dear friends

Please let me know if you prefer receiving this mail-out on e-mail (instead of per mail): A short e-mail note to fkoechlin@datacomm.ch with indication of your own e-mail address will be sufficient.

This mail-out is not about patents nor about genetic engineering; it's about most fascinating plant-research-projects and new discoveries of plants 'senses'. I'm personally convinced that, while fighting against patents and genetic engineering in food and agriculture, we also should think about what we want: What are OUR concepts for a 'sustainable', modern and human future? What kind of research do we prefer? Here an example.

Soon after the beet army worm (a caterpillar) starts attaking a maize-plant and eating on the leafs , their natural ennemies arrive too: in this case a parasitoid little wasp (cotesia margini ventris). They put their eggs into the caterpillars and destroy them slowly from within.

But how do the wasps find their prey so fast? Ted Turlings (University of Neuchatel, Switzerland) and a few other research-teams found out: As soon as the plants get hurt by caterpillars they start to produce volatile odours (mixtures of indol and terpenoids) which strongly attract the female wasps. "These odours are actually so strong you can smell them too", says Turlings. But how do the plants "know" when to call for help? Another series of experiments revealed: Plants can taste the spit of the caterpillars. Maize-leafs smeared with caterpillar-spit immediately started to produce the odours, which attracted female wasps, even without the caterpillars being present. It took researchers 4 years to find the component: A chemical they call volicitin in the spit of the caterpillars is what plants taste. And most amazingly plants seem to have a whole repertoire of different odours they can produce to specifically attract certain wasps and not others - and the wasps "learn" in early age what odour can be associated with what prey."Wasps are good learners", says Ted Turlings. He and his team also found that different varieties of maize produce very different quantities of odours, some very much and some little, that young plants produce much more than old plants, and that dryness favours the production of odours. This could be a future perspective: To get maize-plants produce more odours in order to attract more wasps for a better protection.

Plants have many other strategies to fight off pests. For example, they can produce different toxins (so called phyto-alexins) against invaders or they can induce rapid cell-death of invaded cells to hinder the pests of spreading out. All these strategies depend on quick and reliable recognition-systems. Research of the last years revealed some amazing abilities of plants in this area. Plants not only can taste the spit of caterpillars, they can also smell, see, "feel" and hear, as Andy Coughlin reported in the New Scientist (26/9.98).

Plants can smell:

Wounded tomatoes are known to produce the volatile odour methyl-jasmonate as an alarm-signal. Plants in the neighbourhood can then smell the danger and prepare for the attack by producing chemicals that defend insects or attract predators. And according to New Scientist: "Methyl jasmonate is often used in perfumes and this created problems for the researchers. "We had to warn the women not to use it in the greenhouse because it would mess up the experiment,"
said Bud Ryan (Washington State University)."

Plants can see:

Many plant-organs contain photo-sensitive compounds, each reacting very specifically to certain wavelengths of light. These light-sensors tell the plant if it's day or night, how long the day is, how much light is available and from where the light comes. More recently, researchers

discovered that plants also can detect harmful ultraviolet B-rays and then start producing pigments which filter out these rays. "Plants make their own suntan cream in the presence of UVB", says Gareth Jenkins (University Glasgow).

Plants have a sense of touch.

We all know the mimosa plant (Mimosa pudica): It makes its thin leaves point down at the slightest touch. And carnivorous plants such as the Venus flytrap snap shut by the touch of insects. But a sense of touch is something every plant has, as Coughlin describes: "Ordinary plants need a sense of touch to respond to the buffeting of the wind, which can cause damage to foliage. They try to resist wind by strengthening tissues that are being swayed. The extra energy expended stiffening tissue can cost farmers dear, however. One experiment showed that when maize plants are shaken for 30 seconds each day, yields drop by 30 to 40% compared with unshaken plants", writes Coughlin (New Scientist).

And can plants hear?

Mordecai Jaffe (Wake Forest University) used an instrument that made a loud "warble" and got a doubling in the growth of dwarf pea plants. Jaffe suspects that the plant hormone gibberellic acid, which is instrumental in shoot elongation and seed germination, is involved in the "hearing" response. When Jaffe added chemicals to the pea plants inhibiting the biosynthesis of this hormone, he was unable to reproduce the original effects.

Plants know much more about their surroundings than we tended to believe. How these new findings can be integrated into modern ecofarming-systems still remains to be worked at. It certainly is an exciting perspective. And the more we know, the less possible it seems that isolated technical approaches such as genetic engineering (add or delete or exchange a gene) will offer a solution.
In the light of all these findings: Is it not so that the genetic dogma with its mechanistic view of plants appears even more obsolete?

Literature:

A.Coughlin 'Sensitive flower', New Scientist, 26.9.98// T.Turlings and B.Benrey 'Effects of plant metabolites on the behaviour and development of parasitic wasps',1998,Ecoscience, 5(3),321 //C.M.De Moraes et al, 'Herbivore-infested plants selectively attract parasitoides',1998, Nature, 393,570// H.T.Alborn et al, 'An elicitor of plant volatiles from Beat Armyworm Oral Secretion', 1997, Science, 276,945// W.J.Lewis and K.Takasu, 'Use of learned odours by a parasitic wasp in accordance with host and food needs', 1990, Nature, 348,635

MAIL - OUT 65 (March, 1999)

Dear friends

This mail-out is about a newly emerging risk-discussion: Do genetically engineered Bt-crops poison beneficial insects, bees, soil-organisms, fish, birds? What effects do they have on food-webs, what studies have to be done and why were they not conducted?

At an international meeting of entomologists in Basel in March 1999 scientists raised a red flag: Genetically engineered Bt-crops could poison beneficial insects as well as wiping out pests. Angelika Hilbeck and her team (Swiss Federal Research Station for Agroecology and Agriculture) said they have found new evidence that lacewings, which eat caterpillars and aphids, can be poisoned by transgenic Bt-crops (these crops contain a gene from the soil bacterium Bacillus Thuringiensis coding for a Bt-toxin. The transgenic plant thus produces its own insecticide). They showed already last year that in laboratory tests beneficial lacewings were killed by eating corn-borer caterpillars that had consumed the toxin. In other experiments her team fed identical quantities of purified Bt-toxin directly to lacewing larvae or via caterpillars that had consumed the toxin. 50% more lacewings died after eating the caterpillars than after eating directly the toxin.(N.S., 27.2.99).
At the same meeting Nicholas Birch (Scottish Crop Research Institute) presented his findings that transgenic lectin-producing potatoes (lectin is a toxin of the same group as the Bt-toxin) harmed ladybirds: Eating aphids reared on transgenic lectin-potatoes reduced the the lifespans and egg production of ladybirds.

Novartis, the producer of Bt-maize 175 (which is grown now in Spain), said that these laboratory studies do not reflect real conditions in the environment and pointed out that they had conducted extensive trials before bringing their Bt-maize to the market. But Hilbeck has an explanation why Novartis did not find any dead beneficial insects:"A standard test (..) is that an insect is fed eggs sprayed with Bt-toxins. The problem is, however, that lacelaws do not eat the eggs but suck them out from inside, so they do not get in touch with the poison on the outside of the egg. Only with long-time feeding trials and a very carefull set-up of the experiment can such impacts be studied."(Swiss Tagesanzeiger, 19.3.99). And such experiments have not been done.

Bt-crops are probably the most important transgenic crops: Bt-maize, Bt-cotton, Bt-potatoes or Bt-rice grow on fields all over the world. 14 out of 43 commercialised transgenic crops in the US are Bt-crops. Furthermore, in the US there is a giant patent-battle going on over who will get monopoly controll over these crops: Up to June 1998, 482 patents had been submitted or awarded mentioning Bt, some 95 of these patents involve transgenic plants. The top ten patentees hold 62% of all patents, with Dow holding 98 and Novartis 36 patents. (Robin Jenkins, in 'Seedling, Sept.'98)

Industry's main-argument for the safety of Bt-crops always was the fact that Bt-emulsions from Bt-bacterias have been used as a biological and sprayable insecticide throughout the world since the early 1950s, and nothing happened. However, there are 2 important differences between the sprayable Bt-insecticide and the form of Bt engineered into the genome of crops, as 'World Watch' (Jan./Feb.1999) points out:
"First, while the naturally derived spray version of Bt is highly specific (its toxidity is activated only in the gut of certain species), the genetically modified version has been altered to work against an array of insects - harmful or not. The recent studies showed that beneficial insects were also harmed by Bt (...) The result was a 2-fold increase in adult mortality and reproductive failure in 2 very different beneficial species. The studies also showed dramatically reduced fitness and increased mortality in the beneficial larvae and eggs (..). These side-effects of Bt crops have now been demonstrated for a wide variety of insects and soil organisms, and preliminary studies suggest that the adverse effects could even be felt by insect-eating bird populations, many levels up the farm foodweb - a foodweb that includes plants and animals consumed by humans.
The **second** significant difference is that Bt-crops deliver extremely high levels of the toxin - roughly 10 to 20 times the lethal dose of sprayable formulations. Mark Whalon (Michigan State University) notes, that in contrast to the carefully timed applications of sprayable Bt and the

"micrograms" sprayed each time (...) "these transgenic crops are now pumping out huge amounts of toxins from all tissues throughout the entire growing season, from germination to senescence."
The scientists also warn that the more aggressive the measures for pest eradication, the greater the likelyhood that successive generations of pests become more resistant. The long-term results would be a mutual arms race between farmers and pests, in which plants engineered to secrete increasingly toxic chemicals would be deployed against increasingly resistant strains of pests. This heighened threat of Bt-resistence, coupled with the devastation of beneficial insect populations that help keep pests in check, could lead to massive crop losses.
Although initial large scale plantings of Bt-crops may appear benign, it will likely take several seasons for toxidity and resistence problems to emerge. (..) The scientists advocate a moratorium on large scale releases of Bt-crops until the long-term ecological effects are better assessed".

MAIL - OUT 64 (February, 1999)

Dear friends

This mail-out is about GM (genetically modified) food and Arpad Pusztai's experiments - the time has come for us to draw the political conclusions out of this (and other) food-scandal(s) : "The pressure for a moratorium on genetically modified food - at least until more rigorous testing has been done - is beginning to look like a tidal wave" (The Guardian, 12/2/99).
In August the British scientist Arpad Pusztai voiced his concern that present testing methods for GM food may not be adequate. Rats that were fed with transgenic potatoes suffered a weakenbed immune system and damage to vital organs.

After announcing his results in the public Arpad Pusztai,a highly respected scientist was suspended by his employer, the Rowett Research Institute, for being responsible of misleading information; even 'scientific fraud' was mentioned in a scientific journal. He was gagged and threatened by legal action if he spoke out in his own defence. All his research-projects were stopped.

Beginning of February this year 22 scientists from all over the world published, after carefull examination of Pusztai's reports, a memoran-dum supporting the controversial findings, requesting Pusztais rehabilitation and the funding of this kind of research.

The transgenic potatoes of Pusztais experiments contained a snowdrop-gene and produced the (naturally occurring) insect-toxin lectin. Pusztai and his team conducted several experiments: "Four feeding trials were carried out with two lines of GNA-GM-potatoes. Each trial included rats fed with non-transgenic parent-line potatoes as control, non-transgenic potatoes spiked with GNA and transgenic GNA-GM-potatoes. In all four experiments feeding transgenic potatoes to rats induced major and in most instances highly significant changes in the weights of some or most of their vital organs. Particularly worrying was the partial liver atrophy observed with cooked transgenic potatoes in all short-time (10 day) studies. Immune organs, such as the spleen and thymus were also frequently affected. "(Dr.Beatrix Tappeser, molecular-biologist at the Oekoinstitut Freiburg and one of the 22 scientists). Stanley Ewen, pathologist at the Aberdeen University, reexamined the stomachs of the rats and found that segments of the stomach were dramatically enlarged in rats who were fed only ten days with transgenic potatoes.

The cause for these damages is unclear. The Guardian (12.2.99): "If it can be shown that the lectin was responsible, this could implicate transgenic crops containing other lectins, namely Bt toxin (as, for example, the Novartis Bt-maize). However, some scientists believe the problem may lie with one of the key genes that forms part of the genetic engineering process itself. The so-called cauliflower mosaic virus promotor is used in most GM-food, such as the soya .(..). It was these far reaching implications for one of the worlds most aggressive expanding industries, that put Dr.Pusztai in the eye of the storm since last summer (..). He said he would not eat transgenic potatoes and found it "very, very unfair to use our fellow citizens as guinea pigs."" Of course it is very difficult to extrapolate the results from experiments on rats to humans. But if already rats show such devastating effects, GM-food should never be allowed as human food, without previous extensive testing. Beatrix Tappeser:" Such a test programme as conducted by Arpad Pusztai until now has not been applied to other transgenic crops, also not to those already approved for the market place. It is to ask if the impact he has shown could possibly occur also with other GM-crop-plants. Arpad Pusztai asked for thorough testing and tightening the rules in order not to harm his fellow citizens - an upright and responsible position. Unfortunately his working programme has been closed down."

Re "tidal wave" of moratorium-requests, some new examples: In Great Britain a new and broad coalition of 29 consumer, development, health and environment organisations calls for a 5 year freeze on GM crops, food and patents. Dr Vyvyan Howard, Toxicologist: "the scientific evidence does not adequately address the areas of uncertainty: a five year freeze is needed on the science;" Dr Vandana Shiva, Action Aid Advisor and leading campaigner in India "Genetic Engineering and its patents are likely to keep the developing world in poverty;" Dr Simon Lyster, the Wildlife Trusts: "British wildlife is already under threat from intensive farming:

GMOs could make a bad situation even worse." Mr Malcolm Walker, Chief Executive Iceland Foods: "A five year freeze makes sound business sense and the consumer wants it". Greenpeace International calls for immediate and total ban on GMO food. "Of course further research and a full investigation of this latest scandal around GE food is needed, but no food should be on the market until it is proven safe", says Benny Haerlin.

More info:

http://www.keysites.com/nsplus/insight/gmworld/gmfood/gmfood.
html and http://www.rri.sari.ac.uk (Homepage Institute), or e-mails: tappeser@oeko.de , genet@agoranet.be

MAIL-OUT 63 (January, 1999)

Dear friends

I was just writing the new mail-out when I got these outrageous news. Skipping everything else I'll bring them here - also in the hope that by carefull worldwide watching we'll be able to react fast and oppose Terminator-patents wherever they get granted.

New patents for 'Suicide Seeds'

The Rural Advancement Foundation International (RAFI), a Canadian-based rural advocacy organization, has uncovered **over three dozen new patents** describing a wide range of techniques that can be used for the genetic sterilization of plants and seeds. "The patents reveal that engineered seed sterility is not an isolated research agenda - it's the Holy Grail of the ag biotech industry," says Pat Mooney of RAFI. The disclosure follows on the heels of the "Terminator" patent (see mail-out 59 and 61). "The notorious Terminator patent is just the tip of the iceberg," explains Mooney, "Every major seed and agrochemical enterprise is developing its own version of suicide seeds."

"We've uncovered dozens of patents that disclose new and more insidious techniques for genetic sterilization of plants and seeds - and even animals," says Edward Hammond of RAFI. "Novartis, AstraZeneca, and Monsanto are among the Gene Giants who have sterile seeds in the pipeline, while others like Pioneer Hi-Bred, Rhone Poulenc, and DuPont have technologies that could easily be turned into Terminators." The primary goal of several of the the newly patented techniques is to sterilize seed so that farmers cannot save and re-plant seed.

A number of the patents use benign-sounding technical terms such as "controlled gene expression" linked to "inducible promoters" to describe their sterilization techniques. Other patents describe "killer genes" that destroy pollen, or "GRIM proteins" that do the same to invertebrates or even mammalian cells. A patent owned by Astra/Zeneca candidly admits that their sterilization processes "are not desirable per se."

Sterile Seeds: Why Worry? "These technologies are extremely dangerous," explains RAFI's Mooney, "because over 1.4 billion farmers - primarily poor farmers in Africa, Asia and Latin America - depend on farm-saved seed as their primary seed source. If they can't save seed, they can't continue to adapt crops to their unique farming environments, and that spells disaster for global food security."

"Genetic seed sterility is not about improving the productivity or quality of crops, it's a quest to increase seed industry profits," adds Mooney, "First and foremost, these technologies are intended to force farmers to buy seed every season and to take still more crop production control away from farmers."

The patents reveal that companies are developing suicide seeds whose genetic traits can be turned on and off by an external chemical "inducer" -- mixed with the company's patented agrochemicals. In the not-so-distant future, we may see farmers planting seeds that will develop into productive (but sterile) crops only if sprayed with a carefully prescribed regimen that includes the company's proprietary pesticide, fertilizer or herbicide. The latest version of Monsanto's suicide seeds won't even germinate unless exposed to a special chemical, while AstraZeneca's technologies outline how to engineer crops to become stunted or otherwise impaired if not regularly exposed to the company's chemicals. RAFI calls it "Traitor Technology."

Sound far-fetched? Not according to Novartis (a Swiss life industry giant), whose patent (US 5,789,214) describes a process for chemically regulating a number of developmental processes in plants -- such as germination, sprouting, flowering, fruit ripening, etc. The patent specifically mentions that the chemical regulator can be applied to plants in combination with a fertilizer or herbicide. "If the companies can genetically program suicide seeds to perform only

with the application of proprietary pesticide or fertilizer, it means they will increase sales of their patented agrochemicals and other proprietary inputs," explains Edward Hammond."Chemically-dependent suicide seeds are a dazzling technological achievement and a brilliant marketing strategy, but it's grim news for farmers and the environment."

"If Traitor technologies are developed for commercial sale," predicts Mooney, "farmers will be forced to surrender control of their seed supply and the Gene Giants will ultimately dictate what the farmer grows, how to grow it, and where to sell it. Seed sterility is not about insuring quality or productivity, it's a power grab pure and simple," concludes Mooney.

"The seed and agrochemical industry will argue that engineered seed sterility is highly beneficial to the environment because it will eliminate the problem of horizontal gene transfer - it will prevent cross-pollination and thus the escape of engineered genes from transgenic plants to nearby weeds or wild relatives," explains Hope Shand of RAFI.And industry will argue that they can't continue to develop new, more productive varieties for agriculture unless they get a fair return on their investment.

No matter what rationale is used by the Gene Giants to engineer social acceptance of seed sterility, the technology is unacceptable to growing numbers of civil society organizations around the world who are calling for Terminator Technologies to be banned by governments.Terminator-technologies will be debated at several United Nations bodies, including FAO in April, the Convention on Biological Diversity in May, the UN Commission on Science, Technology, and Development in May.
More infos: http://www.rafi.org

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