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invalid CSS module
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- 2) /home/gmodebate.org/httpdocs_local/lib/admin.inc.php(225): **print()**
- 3) /home/gmodebate.org/httpdocs_local/lib/publish.inc.php(45): **Publisher\A()**
- 4) /home/gmodebate.org/httpdocs_local/lib/publish.inc.php(52): **_error()**
- 5) /home/gmodebate.org/httpdocs_local/lib/css-module.inc.php(48): **error()**
- 6) /home/gmodebate.org/httpdocs_local/lib/css-module.inc.php(58): **_add()**
- 7) /home/gmodebate.org/httpdocs_local/pages/pdf-cover.php(34): **add()**
- 8) /home/gmodebate.org/httpdocs_local/pages/pub-api.inc.php(36): **require()**
- 9) /home/gmodebate.org/httpdocs_local/subindex.json.php(70): **require()**

Immoral Maize - definitive account of Chapela affair

Published: 07 May 2009

NOTE: This is far and away the best account of the Mexican maize scandal and the campaign by Monsanto and its supporters to discredit the Berkeley researchers, David Quist and Ignacio Chapela

Taken from the new SpinProfiles website - www.spinprofiles.org - it's a chapter extracted from Andy Rowell's book, 'Don't Worry, It's Safe to Eat'. The book also contains the definitive account of the Pusztai affair, where Rowell also played a key role as an investigative journalist in exposing the vicious campaign of attack on Dr Pusztai.

Andy Rowell is a SpinProfiles editor and made the chapter available because it provided useful background on a number of individuals and organisations featured in SpinProfiles.

Immoral Maize
Andrew Rowell
http://tiny.cc/mvCFC (http://tiny.cc/mvCFC)

Immoral Maize is an extract from 'Don't Worry, It's Safe to Eat' by Andrew Rowell. Reprinted with permission. Earthscan Ltd, 2003, ISBN-13: 978-1853839320

'I don't want to be a martyr by any means, but I cannot avoid now realising that this is a very, very well concerted and coordinated and paid for campaign to discredit the very simple statement that we made.' Ignacio Chapela

'Current gene-containment strategies cannot work reliably in the field.' - Nature Biotechnology, Editorial [1]

In the autumn of 2000 a graduate student from the University of California held a workshop for local peasant farmers in the beautiful mountainous region of Sierra Norte de Oaxaca in southern Mexico. The graduate, David Quist, hoped to show the farmers how to test their seeds for GM. To do this he thought he would show them the difference in the purity of the local maize, called criollo, compared to the maize that had been shipped in from the USA, where some 40 per cent is GM. The US maize would test positive for GM and, naturally, the Mexican maize would be negative, he thought. But Quist was wrong. For some reason, instead of the local maize being negative, it kept coming up positive. [2]

Quist was visiting the region because his supervisor, Dr Ignacio Chapela, who was originally from Mexico City, had been working with the campesinos or peasant farmers in Oaxaca for over 15 years, assisting them in community sustainable agriculture.

Quist was told by Chapela to bring the samples back to the USA, where the two would repeat the experiments and test the native maize 'landraces' for contamination by GMOs. Although there had been a moratorium on the commercial growing of GM in Mexico since 1998, there was general concern that GM maize was coming across the border from the USA, either as seed or as 'food aid' and that it was contaminating the indigenous species.

This was seen as a worry for various reasons, the main one being that contamination threatens Mexico's unique maize genetic diversity. Mexico is the traditional home of corn, where the plant was first domesticated some 10,000 years ago. It is an important crop for a quarter of the nation's 10 million small farmers and corn tortillas are a central part of nation's diet. But now due to

NAFTA (the North American Free Trade Agreement), the country is a net importer of the crop. With some 5 million tonnes coming in from the USA every year, and because there is no mandatory labelling, there is no way of knowing if this corn is GM or not. [3]

Greenpeace had launched a campaign in Mexico in January 1999 warning the Mexican Government that GM maize imports from the USA 'would end up polluting Mexican corn varieties'. 'The aim was to stop the imports', says Hector Magallon Larson, from Greenpeace Mexico. 'Greenpeace wanted to highlight the inconsistency of the Mexican government stance of supporting a moratorium but allowing millions of tonnes of GE corn to pour over the border.'

The campaign was not well received in official circles. 'The main response came from the Minister for Agriculture,' says Hector Magallon Larson. 'He said these corn imports were only for human food and animal feed, so the corn shouldn't be planted. They also said that the corn was treated with a fungicide that made the seed sterile so it couldn't grow.'

Greenpeace took samples of corn imported from the USA in March 1999, analysing samples from three different boats docked in Veracruz. The results showed that it was Bt corn made by Novartis. The campaigning group even planted some of the seeds and grew them, making sure to harvest them before they released pollen. Then they took the GM corn to the Ministry of Agriculture. 'We told them it could grow, but they said it would not happen. They have done nothing to stop or solve the problem,' says Magallon Larson. Despite Greenpeace's concerns, Dr Chapela says that: 'We were not expecting to find transgenics when we went looking for them in Oaxaca'.

Although they were working in Mexico, Chapela's and Quist's academic base is in Berkeley, where Chapela is an assistant Professor. Although a microbial ecologist by training, he had served on the prestigious National Research Council's Committee on Environmental Impacts Associated with the Commercialization of Transgenic Plants, whose report was published in 2002 by the National Academy Press. [4] Both scientists had sprung to prominence in 1988 as two of the key opponents of a multi-million dollar alliance between Novartis and the University of Berkeley. Unbeknown to Chapela and Quist at the time, their opposition to the Novartis deal would come back to haunt them after their research was published. The ensuing saga led to the most acrimonious fight between opponents and proponents of GM since the Pusztai affair. It also laid bare a central strategy of the biotechnology industry: that of GM contamination, and raised questions about what many believe is one of its Achilles' heels: that it could be inherently unstable. The argument over

whether Quist and Chapela were attacked because they did bad science or because they questioned GM continues to run and run.

Back in the laboratory, Quist and Chapela starting using the standard amplification technique for DNA called polymerase chain reaction. Known as PCR for short, it is used to test 'for the presence of a common element in transgenic constructs' and in this case that was the promoter for the CaMV virus. The CaMV, the promoter at the heart of the Pusztai controversy, is seen as an ideal marker to tell if transgenic contamination has occurred. [5] But the PCR technique can also be problematic, as the amplification process can cause 'false positives' where simple contamination in the lab can seem to be part of the transgenic DNA. So researchers can believe they are looking at genetic contamination when in fact they are looking at experimental contamination.

Chapela and Quist also analysed control samples that came from maize grown in Peru and from seeds from the Sierra Norte de Oaxaca region in Mexico taken in 1971, long before the introduction of GM crops. They found positive PCR amplification in four of the six samples of the Oaxaca maize, but no contamination in the Peruvian maize or the older sample. [6]

They then undertook a further similar analysis, called inverse PCR, so that they could establish the precise position of the transgenic sequences. They were able to identify the DNA fragments flanking the CaMV promoter sequence through inverse PCR tests, known as iPCR. The fragments were scattered about in the genome, suggesting a random insertion of the transgenic sequence into the maize genome. [7]

So essentially, Quist and Chapela reached two conclusions. The first was that GM contamination had occurred in Mexican maize and the second was that the GM DNA seemed to be randomly fragmented in the genome of the maize. If the first point was contentious, the second was explosive, as it suggested that transgenic DNA was not stable. Quist and Chapela knew that if the research was published it would cause an international outcry, so they wanted to make sure that their research was correct. The biotech industry had hardly recovered from the StarLink scandal in the USA, and GM contamination of Mexican maize would represent a 'nightmare' scenario for the industry. [8]

'I repeated the tests at least three times to make sure I wasn't getting false-positives', says Quist. [9] Convinced of their findings, Chapela shared the preliminary results with various Mexican government officials who started to do their own testing. He also approached the scientific journal Nature with a view to publishing the work.

'I had been talking to government officials, because I thought it was the responsible thing to do, even though it was preliminary research', recalls Dr Chapela. [10] At one meeting the aide to the Biosafety Commissioner, Fernando Ortiz Monasterio, told Chapela that his boss wanted to see him. 'The guy just sat outside the door and when I came out, he almost took me by the hand and put me in a taxi with him to see his boss,' he says.

A Hollywood script-writer could have conceived what happened next. Chapela was hauled up to Monasterio's 'office' on the 12th floor of an empty building. 'The office space was absolutely empty', recalls Chapela. 'There were no computers, no phones, the door was off its hinges, there were cardboard boxes as a table. The official is there with his cell-phone beside him. We are alone in the building. His aide was sitting next to me, blocking the door.'

With obvious emotion, Dr Chapela recalls what happened next. 'He spent an hour railing against me and saying that I was creating a really serious problem, that I was going to pay for. The development of transgenic crops was something that was going to happen in Mexico and elsewhere. He said something like I'm very happy it's going to happen, and there is only one hurdle and that hurdle is you.'

Sitting stunned, Chapela replied: 'So you are going to take a revolver out now and kill me or something, what is going on?' Then Monasterio offered Chapela a deal: 'After he told me how I had created the problem, he said I could be part of the solution, just like in a typical gangster movie. He proceeded to invite me to be part of a secret scientific team that was going to show the world what the reality of GM was all about. He said it was going to be made up of the best scientists in the world and you are going to be one of them, and we are going to meet in a secret place in Baja, California. And I said, "who are the other scientists"', and he said "Oh I have them already lined up, there are two from Monsanto and two from DuPont". And I kept saying "Well that is not the way I work, and I wasn't the problem, and the problem is out there".'

Then events took a very sinister turn. 'He brings up my family', recalls Chapela. 'He makes reference to him knowing my family and ways in which he can access my family. It was very cheap. I was scared. I felt intimidated and I felt threatened for sure. Whether he meant it I don't know, but it was very nasty to the point that I felt "why should I be here, listening to all this and I should leave".'

Monasterio later admitted to the BBC that he had met Chapela, but vehemently denied threatening him in any way. He said that the meeting had taken place not on the 12th floor, but on the '5th floor of our offices, which is

an office of the Ministry of Health, in the southern part of town where we work'. He said that at the meeting they had discussed 'the issues of the presence of maize, the importance of publishing, that what we were doing is research, and that when we have the results from our own researchers, we will share with him'. [11]

Chapela was told by Monasterio that he was in charge of biosecurity and 'I'll tell you what biosecurity is really about, it is about securing the investment of people who have put their precious dollars into securing this technologies, so my job is to secure their investment'.

'I think first he was trying to intimidate me into not publishing,' says Chapela. Once Monasterio realized that Chapela was going to try and publish his results, that 'very night he called a meeting with Greenpeace and the people from Codex and people from the Senate to divulge the results'.

The reason that Monasterio wanted the results made public was simple: 'I had said to him', says Chapela, 'that if the information was released before it was published in Nature then Nature would think twice about publishing it'. 'He fed it directly to Greenpeace, which is a lot easier to discredit than Nature,' says Chapela, adding that Monasterio knew that 'the media coverage would seriously threaten publication in Nature'. Monasterio denies breaking any confidentiality agreement by divulging the results early. [12]

But the threats intensified against Chapela, who received a letter from an agricultural under-secretary, saying that the government had 'serious concerns' about the 'consequences that could be unleashed' from his research. Moreover the government, would 'take the measures it deems necessary to recuperate any damages to agriculture or the economy in general that this publication's content could cause'. [13] 'He signed it before the publication is out and it is obvious that he is trying to intimidate me into not publishing', says Chapela, who believes that the approach is not surprising, as the Agriculture Ministry itself is 'riddled with conflicts of interest. There are just working as spokespeople for DuPont, Syngenta and Monsanto'.

In contrast to the agricultural officials, others were worried, and started to replicate the research. As Quist and Chapela outline: 'During the review period of this manuscript, the Mexican government "¦ established an independent research effort. Their results, published through official government press releases, confirm the presence of transgenic DNA in landrace genomes in two Mexican states, including Oaxaca'. [14] On 17 September 2001, Mexico's Secretary for Environmental and Natural Resources released partial results of its own study, confirming that transgenic maize had been found in 15 of 22

areas tested in Oaxaca and nearby Puebla. [15]

Just over two months later, Chapela's team published in Nature. 'We report', wrote Chapela and Quist, 'the presence of introgressed transgenic DNA constructs in native maize landraces grown in remote mountains in Oaxaca, Mexico, part of the Mesoamerican centre of origin and diversification of this crop'. In plain English, they were reporting contamination of native corn by its GM equivalent.

The scientists were both 'surprised and dismayed' over their findings, but admitted they had no way of knowing whether the contamination was from a loose implementation of the moratorium or due 'to introgression before 1998 followed by the survival of transgenes in the population'. [16]

'Whatever the source, it's clear that genes are somehow moving from bioengineered corn to native corn', says Chapela. 'This is very serious because the regions where our samples were taken are known for their diverse varieties of native corn, which is something that absolutely needs to be protected. This native corn is also less vulnerable to disease, pest outbreaks and climatic changes.' [17]

Once again it was time to shoot the messenger. 'We are just facing every single level of intimidation and aggression that you can imagine', says Chapela. 'It is obviously very well funded and very well coordinated'. 'The main attack, the most damaging attack' came 'from my own colleagues within the university', says Chapela, 'who are mad at me because I stood up against Novartis coming in with US$50 million and buying the whole college. It has to be said that the immediate consequences might be very dire for me as my tenure is being reviewed.'

Chapela says that because of his stand against Novartis: 'They are saying that we are activists, that we are anti-biotech'. Ironically before joining the staff at Berkeley Chapela had worked for Sandoz, which later merged with Ciba-Geigy to form Novartis. [18]

Some of the most virulent attacks came via the AgBioView discussion group and AgBioWorld.org website run by C S Prakash, who is a Professor of Plant Molecular Genetics at Tuskegee University, Alabama. Prakash's foundation and website are an influential talking shop for GM scientists world-wide and a key place to influence other scientists. But the underlying reason for its existence is the promotion of biotechnology and the website features a Declaration in Support of Agricultural Biotechnology, signed by more than 3300 scientists from around the world, including 19 Nobel Prize winners.

Prakash calls the Quist and Chapela study ‘flawed’, saying that the ‘results did not justify the conclusions’. He says that they were ‘too eager to publish their results because it fitted their agenda’. A co-founder of the AgBioWorld Foundation, is Gregory Conko, from the right-wing free enterprise think-tank the Competitive Enterprise Institute (CEI), based in Washington. The CEI has a long history of working with the antienvironmental ‘Wise Use’ movement, and is a key player in the backlash against people speaking out on environmental issues. [19]

Prakash says that the AgBioWorld website ‘played a fairly important role in putting public pressure on Nature, because we have close to 3700 people on AgBioView, our daily newsletter, and immediately after this paper was published, many scientists started posting some preliminary analysis that they were doing’.

‘It was not just the paper from Chapela that was damaging from the point of view of biotechnology’, says Prakash. ‘But a large number of media interviews, where he claimed that Mexican biodiversity was contaminated, the ability to feed its people was threatened, really outlandish claims that probably irked many of the scientists.’

The first attack came on Prakash’s website within hours. But it was not a scientist who fuelled the attacks, but someone called Mary Murphy. ‘The activists will certainly run wild with news that Mexican corn has been “contaminated” by genes from GM corn not currently available in Mexico... It should also be noted that the author of the Nature article, Ignacio H Chapela, is on the Board of Directors of the Pesticide Action Network North America (PANNA), an activist group’ wrote Murphy.

Chapela was ‘not exactly what you’d call an unbiased writer’. [20] The next AgBioView bulletin led with a posting from someone called Andura Smetacek, under the head-line ‘Ignatio Chapela activist FIRST, scientist second’. It read: ‘Chapela, while a scientist of one sort, is clearly first and foremost an activist’. ‘Searching among the discussion groups of the hard-core anti-globalization and anti-technology activists Chapela’s references and missives are but a mouse click away.’

Smetacek argued that the article was ‘not a peer-reviewed research article subject to independent scientific analysis’. Her email included detailed information on the author and tried to undermine his credibility. ‘A good question to ask of Chapela would be how many weeks or months in advance did he begin to coordinate the release of his “report” with these fear-

mongering activists [Greenpeace, Friends of the Earth]? Or more likely, did he start earlier and work with them to design his research for this effect?' [21] In the space of an email, peer-reviewed research becomes non peer-reviewed research designed by 'hard-core' environmental groups.

In the next bulletin, on 30 November, other contributors continued the theme started by Smetacek and Murphy, questioning Quist and Chapela's 'activist' links and their research. 'Mary Murphy's comment echoes my reaction when I read the news reports"¦ This alarmist reporting of preliminary, incomplete research is just another example of the nutty illogic of the anti-GE luddites.' [22]

These attacks by Smetacek and Murphy were sent immediately after the publication of the Nature article. Their character assassinations set the tone for others to follow, as we shall see. They had moved the debate from the message to the messengers and it was time for character assassination. Even the journal Science noted the part played by what it called, 'widely circulating anonymous emails' accusing researchers, Ignacio Chapela and David Quist, of 'conflicts of interest and other misdeeds'. [23] Some scientists though, were alarmed at the personal nature of the attacks. 'To attack a piece of work by attacking the integrity of the workers is a tactic not usually used by scientists', wrote one. [24]

A virtual world

So who are Mary Murphy and Andura Smetacek, who between them have posted over 60 articles on the Prakash site? Mary Murphy's email is mmrph@hotmail.com (mailto:mmrph@hotmail.com), which seems like just another hotmail address. However, on one occasion, Murphy posted a fake article claiming that Greenpeace had changed its stance on GM due to extra strength GM marijuana. Although Murphy used her hotmail address mmrph@hotmail.com (mailto:mmrph@hotmail.com), she left other identifying details, including 'bw6.bivwood.com'. [25]

Bivwood is the email address for Bivings Woodall, known as the Bivings Corporation, a PR company with offices in Washington, Brussels, Chicago and Tokyo. Bivings has developed 'internet advocacy' campaigns for corporate America [26] and has been assisting Monsanto on internet PR ever since the biotech company identified, in 1999, that the net had played a significant part in its PR problems in Europe. While Bivings claims its work for Monsanto is an example of how it approaches contentious issues in a 'calm and rational way', it uses the internet's 'powerful message delivery tools' for 'viral dissemination'.

As it outlines: ‘Message boards, chat rooms, and listservs are a great way to anonymously monitor what is being said. Once you are plugged into this world, it is possible to make postings to these outlets that present your position as an uninvolved third party.’ [27]

But evidence points to the fact that Bivings, or those who have had access to its email accounts, has covertly smeared biotech industry critics via a website called CFFAR (Center for Food and Agricultural Research), although no such organization appears to exist, as well as articles and attacks posted to listservs under aliases. The attack on the Nature piece is a continuation of this covert campaign. [28]

Andura Smetacek is the original source of a letter that was published in The Herald newspaper in Scotland under the name of Professor Tony Trewavas, a pro-GM scientist from the University of Edinburgh. This letter was the subject of a legal action between Greenpeace, its former director Peter Melchett and the newspaper. The case went to the High Court and resulted in Peter Melchett being paid damages, which he donated to various environmental groups, and an apology from The Herald. [29]

Trewavas has always denied that he wrote the defamatory letter, and Andura Smetacek has acknowledged that ‘I am the author of the message, which was sent to AgBioWorld. I’m surprised at the stir it has caused, since the basis for the content of the letter comes from publicly available news articles and research easily found on-line’. [30]

Despite the email address, Andura Smetacek is also a ‘front email’. Although in early postings to the AgBioView list, she listed her address as London, in a dispute with The Ecologist magazine Andura left a New York phone number. However, enquiries have discovered that there is no person of that name on the electoral roll or other public records in the USA. Despite numerous requests to give an employer or verify a land address for The Ecologist, Smetacek has refused to do so. [31] Subsequent attempts by both British and American journalists to track down Smetacek have also elicited no answers. [32]

The first exposé of the Bivings connection to the Nature article was published by myself in the Big Issue magazine, and by the anti-GM campaigner, Jonathan Matthews, in The Ecologist magazine. [33] Bivings denied being involved in the dirty tricks campaign, saying that the reports were ‘baseless’ and ‘false’, and merited ‘no further discussion’. [34] Environmental commentator George Monbiot subsequently published two articles in The Guardian. ‘The allegations made against the Bivings Group in two recent columns are completely untrue,’

responded Gary Bivings, President of the Group. Bivings also contended that ‘the ‘fake persuaders’ mentioned in the articles Mary Murphy and Andura Smetacek are not employees or contractors or aliases of employees or contractors of the Bivings Group. In fact, the Bivings Group has no knowledge of either Mary Murphy or Andura Smetacek'. [35]

BBC Newsnight then took up the story. A spokesperson for Bivings admitted to a researcher from Newsnight that 'one email did come from someone "working for Bivings" or "clients using our services"'. But once again they denied an orchestrated covert campaign. [36] Bivings later argued that they had 'never made any statements to this effect', saying that BBC Newsnight had been 'wrong'. [37]

Gary Bivings also denied any involvement with the CFFAR website. But the website is registered to an employee of Bivings, who was a Monsanto web-guru. Furthermore, Bivings denied any involvement with the AgBioWorld Foundation, yet Jonathan Matthews had received an error message whilst searching the AgBioWorld database that a connection to the Bivings server had failed. Internet experts believed that this message implied that Bivings was hosting the AgBioView database. These experts also noticed technical similarities between the CFFAR, Bivings and AgBioWorld databases. [38]

Prakash, however, denied receiving funding or assistance for the AgBioWorld Foundation and denied working with any PR company, saying that he is 'pro-the technology not necessarily the companies'. There were other tell-tell signs to be found, too. For people who had been so prolific in their attack against Chapela, Mary Murphy and Andura Smetacek suddenly disappeared. Murphy's last posting was on 8 April, just a few days before the Big Issue piece went out. That same month, April 2002, Bivings had posted an article by their contributing editor, Andrew Dimmock, called 'Viral Marketing: How to Infect the World' on the web.

However, after the story broke in the UK press, Bivings changed their on-line version. Out went the sentence 'There are some campaigns where it would be undesirable or even disastrous to let the audience know that your organization is directly involved’ and out went the 'anonymously'. One sentence was changed from ‘present your position as an uninvolved third party' to 'openly present your identity and position’. [40] In the autumn of 2002, Bivings outlined how the term viral marketing had been 'unfairly vilified' in the press, it was nothing more than 'word-of-mouth advertising via the internet'. [41]

Why would a company that had nothing to do with the Nature attack, suddenly change articles on its website? Even more intriguing were the actions of a

Biving's web designer who lived in the locality of the server that had posted the 'Mary Murphy' emails. Having worked at Bivings for seven years, as a senior programmer, this person suddenly changed his online CV, deleting all references to Bivings. Suddenly he had spent the last seven years being a 'Freelance Programmer/Consultant'. The only problem is that his old CV is still on-line in an archive site that repeatedly mentions that he had worked for Bivings.

There was one other slight but important change to the Bivings site that occurred after the publicity too. Bivings had listed 15 different Monsanto websites as clients, however this changed to just a direct link to Monsanto.com afterwards. Were Bivings trying to hide just how much work they did for Monsanto? Once again, you can see the old version on internet archive sites. [42] Finally, the CFFAR website was suspended, with the site hosting an inoffensive 'holding page', but once again it is still available on archive sites. [43] Monsanto denied that it employed Bivings to undertake this kind of work. 'They don't do PR', said a Monsanto spokesperson. 'We speak for ourselves on issues'. [44] This begs the question of what kind of work Monsanto do on the web, and finally solves the mystery of the identity of Andura Smetacek. The company has radically changed its on-line activities in the last few years. After Monsanto's European PR took a 'beating' in 1999, Monsanto's communications director said 'maybe we weren't aggressive enough. When you fight a forest fire, sometimes you have to light another fire'. [45]

In January 2000, Prakash had set up the AgBioWorld website. [46] In July 2000, Andura Smetacek suddenly appeared on AgBioView, writing in a very measured tone. 'While I remain concerned about who controls biotechnology', wrote Smetacek. 'I have come to a disturbing conclusion about some of the groups with whom I have been discussing this issue who so strongly oppose genetic engineering. Their tactics and support for violence and vandalism are unacceptable and must stop.' Smetacek then mentioned the recently registered CFFAR site, saying that she had 'signed a petition to stop these acts of terrorism posted to www.CFFAR.org'. At the time Smetacek gave a London address, although the time and date on the email located it as 'Pacific Day Time', coming from the Pacific Coast of the USA. [47] In the first months of the AgBioView list, messages were forwarded in such a way that it was possible to track the technical 'headers' that shows where a message comes from. The first few from Andura showed they had come from '199.89.234.124'. If you look up these numbers they are assigned to Monsanto in St Louis, Missouri. So, from the email address, it seems that Andura Smetacek writing from London never actually existed, 'she' was a virtual person whose role was to direct debates on the web and denigrate the opposition.

When asked what work they did for Monsanto, a spokesperson for Bivings said 'We run their websites for various European countries and their main corporate site and we help them with campaigns as a consultant and we are not allowed to discuss strategy issues and personal opinions'. They declined to give further details of their work for the biotech company, [48] but they suggested talking to another PR company that worked for Monsanto, called V-fluence.

The contact person given was Rich Levine, who previously worked for Bivings as a Monsanto web-guru. [49] The president of V-fluence is Jay Byrne, who has over 15 years experience in public relations, campaign communications and government affairs. [50] He was also the former chief internet strategist and director of corporate communications for Monsanto, where he spent a quarter of his time monitoring the web for rogue web- and activist sites. [51] In 2001, Byrne gave a presentation to a PR conference called 'Protecting Your Assets: An Inside Look at the Perils and Power of the Internet'. It gave an insight into Monsanto's use of the internet. 'A website alone won't protect your brand', Byrne told the audience, therefore it was necessary to 'Take Action, Take Control'. Ways to do this included: 'Viral marketing and other dialogue opportunities, monitoring and participation'.

One PowerPoint slide showed 'Monitoring' for Monsanto which included 'Daily monitoring of over 500 competitor, industry, "issues group" websites; Daily monitoring of 50+ key listservs, usergroups and chat rooms; Technology monitoring and updates including search engine programs and legal monitoring'.

Another chart on the PowerPoint presentation gave the difference before and after taking control of the internet to rig a search engine to go from finding hits they did not want to finding hits they did want if someone was searching for 'GM foo''. Favourable hits included: 'Glossary of biotech terms; AgBioWorld; AgCare; FDA; Biotech Knowledge Center; CFFAR; Food Biotech Center; and Biotech Basics'. To the uninitiated these would all appear as independent sites, yet we now know that three of these are acknowledged Bivings projects BioTech Terms; Biotech Knowledge Center and Biotech Basics. Two seem to have links to Bivings AgBioWorld and CFFAR. One AgCare is a biotech lobby front in Canada, and the other the US FDA is seen by the biotech industry as an ally.

Of these, the CFFAR site is the most worrying in that it denigrates environmentalists as terrorists. It is the site that Andura wanted the scientists to look at. Once you denigrate someone it becomes easier to attack them, both physically and mentally and even intellectually. Byrne finished by quoting

Michael Dell, the CEO of Dell computers: 'Think of the internet as a weapon on the table. Either you pick it up or your competitor does but somebody is going to get killed.' [52]

The fall-out continues

In January 2002, the Mexican Ministry of the Environment confirmed their findings from the previous year and said that in some remote regions of Oaxaca and Puebla, between 20 60 per cent of tested farms had traces of transgenic material. [53]

The following month Chapela appeared at a press conference with Mexican researchers. Chapela had given some samples to the Environment Ministry who had divided the samples. One batch had been sent to the National University and the other to the Centre for Investigation and Advanced Studies. Both gave details of preliminary research that backed Chapela's findings. [54]

'They have reworked that study in two separate labs, with new sampling and new methodology. Last week, when I was in Mexico', he says when interviewed in March 2002, 'they were announcing that they were close to publication and that everything they had pointed in the same direction and they supported our work. Their principal investigator says they have three levels of analysis the DNA, the protein and the expression level of analysis and everything that I have seen so far makes it extremely unlikely that there are any mistakes in our statement to Nature.'

So Chapela says that there are now three separate studies that have been done by two separate groups that 'confirm what we are saying, down to the quantitative level. I am still hopeful that I am not going to end the way Pusztai has seen himself pushed out of his job and discredited for publication in major journals. I think and I hope that we will be vindicated'.

But despite his optimism, in February 2002, the row intensified when an editorial written by Paul Christou, then at the John Innes Centre, appeared in the journal Transgenic Research. It was brutal. Its title said it all: 'No Credible Evidence is Presented to Support Claims that Transgenic DNA was Introgressed into Traditional Maize Landraces in Oaxaca, Mexico'.

Christou, writing on behalf of the Editorial Board, wrote that Quist and Chapela's paper had 'technical and fundamental flaws'. Sample contamination was the likely cause of the results, not GM contamination. This said, Christou pointed out that 'introgression of transgenes from commercial hybrids into landraces is likely'. [55]

'Recombination is not a satisfactory explanation either, since multiple generations of crossing have been done with all these constructs, and they have been shown to be stable or else they would have not made it through the regulatory system,' wrote Christou. Critics of the industry say that whilst Christou's statement is broadly correct, the applicable regulatory standard for a demonstration of 'stability' is low, especially in the USA. [56]

Moreover, critics of the biotech industry point to regulatory laxness again. Consider the EPA's analysis for the stability of Bt crops. In its reregistration document for Bt crops in 2001, the EPA noted that 'stability and inheritance were not addressed with the registrations' for Monsanto's Bt corn and potato. The EPA said that because these crops had been growing for a number of years with a lack of reports relating to loss of efficacy, ‘this specific endpoint can be considered to have been addressed through commercial use'. [57]

So because the EPA has not been notified of any failures, the products are deemed to be 'stable’. This is exactly the same unscientific analysis whereby, because the authorities have not been notified of any ill effects, GM products are deemed to be 'safe’. Chapela called the Transgenic Research article a 'regurgitation’ of old arguments, but it angered others working on the issue. Peter Rosset from Food First, a think-tank, called it 'a "hit piece" designed to leave the public with a sense of confusion about whether the contamination was real or not'. He continued, citing Pusztai as an example that: 'I firmly believe there is a concerted attempt to make "examples" of scientists who have the courage to be dissidents from the biotech juggernaut. Clearly industry and scientists on the industry gravy train want to stifle scientific dissent, and cast a smoke screen over the public's perception of the risks of GMOs'. [58]

Scientists working in the field agree. Sue Mayer from GeneWatch UK says that 'it is quite extraordinary the lengths the biotech industry and scientific establishment will go to discredit any critical science'. [59] Professor Allan McHughen, from the Crop Development Center at the University of Saskatchewan in Canada, believes that there 'are a group of people who for whatever reason don't want to hear anything at all about reasons to question the technology. I read Chapela's paper over and over again and I just couldn't find anything that was inflammatory about it'. [60]

'I don’t think the science in the second half of their paper was very good,' adds Allison Snow of Ohio State University, who specializes in gene flow. 'But the first half of the paper, while you could always have asked them to do a better job, I thought was well supported. The things they said could have been taken as a threat to the field of ag biotechnology because all along the ag

biotechnologists have been saying that we know what these genes do, they're just like other genes.' [61]

Statements for and against

However, if the industry thought that threatening and undermining Chapela would make the controversy disappear, they were wrong. One of the leading anti-GM protagonists in the USA is Ronnie Cummins of the Organic Consumers Association. 'What the biotech industry is underestimating', says Cummins is that, 'corn is not just another crop down here. It is central to the culture. It is a total insult to the people in Mexico as to what is going on.'

The Organic Consumers Association and Food First were two of the 144 farmer and other civil society organizations from 40 countries that signed a statement on the Mexican GM Maize scandal in February 2002. It stated that 'A huge controversy has erupted over evidence that the Mesoamerican Center of Genetic Diversity is contaminated with genetically modified maize. Two respected scientists are under global attack and the peer-review process of a major scientific publication is being threatened'. The signatories claimed that 'pro-industry academics are engaging in a highly unethical and mud-slinging campaign against the Berkeley researchers'. [62]

On the AgBioView list, this document provoked outrage and the attacks against Chapela intensified. Alex Avery is a well-known adversary of organic food (see Chapter 10). Alex works with his father, Dennis, at the Centre for Global Food Studies that is affiliated to the right-wing think tank, The Hudson Institute. 'Has anyone else picked up on the "Joint Statement on the Mexican GM Maize Scandal" being whored around by the anti-biotech activists?' asked Alex Avery.

Avery followed Smetacek's and Murphy's lead. 'Chapela is an activist assistant professor of microbiology"¦ He isn't a geneticist, but he is on the board of Pesticide Action Network North America (an anti-pesticide activist group) and in 1999 signed an anti-biotech statement calling for a global moratorium on GM crops'. Avery then said that Chapela and Quist were 'far from the "respected scientists" that the Joint Statement claims. 'Then again', wrote Avery 'they do their darndest to paint Arpad Pusztai as a "widely respected scientist" in the statement, despite the drubbing Pusztai's research and methodology took from The Royal Society experts.' Avery then proposed that 'Fellow scientists, perhaps we should get out front on this and post a "joint statement" from academics.' [63] In a statement posted on AgBioWorld.org on 24 February 2002, Prakash wrote that 'the research methodology and its conclusions are however being challenged by a number of groups through

formal letters to Nature (under review), and it was also addressed recently in an editorial in the Journal 'Transgenic Research'. He urged subscribers to the list to sign the petition.[64]

When is a retraction not a retraction?

Finally on 4 April 2002, Nature issued a terse statement on its website that there was disagreement between the Quist and Chapela and one reviewer. Because of this and 'several criticisms of the paper Nature has concluded that the evidence available is not sufficient to justify the publication of the original paper.' [65]

'It is clearly a topic of hot interest,' said Jo Webber from Nature, admitting the story was not just 'technical' but also 'political'. 'Nature has been going for a very long time and this is a very unusual occurrence'. Webber also admitted that she felt her editor had fudged the issue. [66]

The statements put out by Nature seemed to be contradictory and there was confusion as to whether the paper had actually been 'retracted'. The Editor, Philip Campbell, wrote 'The retraction was necessitated by technical flaws in the paper that came to our attention after its publication (which we should have picked up), and by the authors' decision not to retract the paper themselves'. [67]

In contrast, Dr Maxine Clarke, the Executive Editor of Nature wrote a month later in June that the Quist and Chapela paper 'has not been formally retracted by Nature, and stands as a citable publication'. [68] Quist certainly felt it was a fudge: 'I think they wrote in very specific language for a reason, so that it was somewhat equivocal', he says. 'If results come out to corroborate our results, they can say, "See, we didn't ask for a retraction because it is a biological reality; it is happening". If it turns sour, they can say, "See, we were right in putting these guys on the chopping block".' [69]

Chapela was more blunt, accusing Campbell of 'siding with a vociferous minority in obfuscating the reality of the contamination of one of the world's main food crops with transgenic DNA of industrial origin'. [70] Campbell had sent the paper to three referees before deciding whether to retract. Of the three, only one scientist thought the paper should be retracted though all said there were flaws in its second part the section on iPCR. Others joined in the argument, and the journal was accused of setting a 'dangerous precedent' and it was added that, 'by taking sides in such unambiguous manner, Nature risks losing its impartial and professional status'. [71]

Due to the connections between the prominent attackers and the biotech industry, Chapela requested that Nature print a 'statement of conflict of interest from all authors,' as regarding the Berkeley Novartis connection. 'It cannot go unnoticed that the antagonists signing the letter against the Nature piece should all be connected directly with this local political scandal', wrote Chapela. Campbell refused.

Chapela also noted that 'Given that two of the three reviewers of the exchange between our critics and ourselves unequivocally state that our main results and statements are not legitimately challenged by the letters included here, we find it unjustified that Nature should decide to remove its endorsement of a paper which itself was subjected to several rounds of a particularly stringent review process'.

Chapela noted how the second referee had said 'none of the critics seriously dispute the main conclusion' and the third said, 'none of the comments has successfully disproven their main result that transgenic corn is growing in Mexico and crossing with local varieties'. Yet Dr Campbell published the retraction citing only the first referee, leading to the charge that 'he had ignored the advice of most of its own advisers'. [72]

In the end Nature published two critical letters, one from a team led by Nick Kaplinsky in the Department of Plant and Microbial Biology the department at Berkeley that received the Novartis funding. The lead author of the other letter was Matthew Metz, who also used to be at the Department of Plant and Microbial Biology at Berkeley. [73]

Both lead authors Matthew Metz and Nick Kaplinsky were signatories to the Prakash 'Joint Statement' that Prakash had urged scientists to sign. It has received nearly 100 signatories. [74] Metz had coedited a pro-biotech document with the AgBioWorld Foundation, the Liberty Institute and the Competitive Enterprise Institute two years before. [75] Another co-editor was Andrew Apel, editor of the industry newsletter, AgBiotech Reporter, who used the 11 September attacks to vilify anti-GM activists and scientists, specifically Drs Vandana Shiva and Mae- Wan Ho, as having 'blood on their hands'. [76]

In his letter to Nature, Metz argued that Quist and Chapela's analysis was 'flawed' and that the authors had 'misinterpreted' a key reference. Kaplinsky's letter argued that Quist and Chapela may have been 'confused', and although transgenic corn could be growing in Mexico, their claims were 'unfounded'. [77]

Chapela admits that Nature was 'under incredible pressure from the powers

that be', and that the journal had asked him to respond to four letters that were critical of his paper, of which only the Kaplinsky and Metz letters were published. Both of these critics work or used to work at the department that received the Novartis funding. Metz's co-author, Johannes Fütterer, is a post doctorate student at ETH-Zurich, under Wilhelm Gruissem. According to Chapela 'Gruissem was head of department in Berkeley and the person who brought Novartis to us'. Chapela believes that it is this issue that lies at the heart of the whole saga. 'I and a few other people stood up against it and we made a big scandal that went around the world. It became a very big scandal', he says. 'And they just cannot forgive that.' Metz had even written to Nature defending the Novartis deal. [78] Chapela points to an article in the German press that says that Fütterer only 'decided' to write the letter with Metz after consultation with his boss, Gruissem, and 'his American research associates'. [79] So everyone who had letters published in Nature was in some way connected to the Novartis-Berkeley relationship. [80]

This point was also taken up by others, pointing out the controversy was taking place 'within webs of political and financial influence that compromise the objectivity of their critics'. Correspondence to Nature also pointed out that the 'Nature Publishing Group actively integrates its interests with those of companies invested in agricultural and other biotechnology, such as Novartis, AstraZeneca and other "sponsorship clients", soliciting them to "promote their corporate image by aligning their brand with the highly respected Nature brand"'. [81] As if to prove their point, just over six weeks later, Nature ran a special 'Insight' into food and the future, sponsored by Syngenta that contained several pro- GM and anti-organic-farming opinion pieces.82 But Metz and Kaplinsky replied that their criticisms of Quist and Chapela, were 'exclusively over the quality of the scientific data and conclusions' and that their funding has 'absolutely nothing to do' with their criticisms. [83]

However, the journal also published a further letter by Quist and Chapela where they acknowledged that in relation to iPCR they had misidentified certain sequences. But they added 'the consistent performance of our controls, as reported, discounts beyond reasonable doubt the possibility of false positives in our results'. The authors, noted that 'to address' the challenges laid down by their critics they had used a 'non-PCR-based method' called DNA DNA hybridization. 'The results of these experiments' they argued, 'continue to support our primary statement"¦ The DNA-hybridization study confirms our original detection of transgenic DNA integrated into the genomes of local landraces in Oaxaca.' [84]

Ironically the fact that GM contamination has occurred is now not disputed by the GM opponents. 'Quist and Chapela have subsequently presented data that

further supports the presence of transgenes in maize landraces a point that has not been disputed', argued Prakash on AgBioWorld. [85]

In April, Jorge Soberon, the executive secretary of Mexico's National Commission on Biodiversity, announced the findings of the Mexican government's research at the International Conference on Biodiveristy at The Hague. Soberon confirmed that the tests had now shown the level of contamination was far worse than initially reported in both Oaxaca and Puebla. A total of 1876 seedlings had been taken by government researchers and evidence of contamination had been found at 95 per cent of the sites. One field had 35 per cent contamination of plants alone. The Mexican government also re-confirmed the presence of the Cauliflower Mosaic Virus. [86]

Jorge Soberon said soberly that: 'This is the world's worst case of contamination by genetically modified material because it happened in the place of origin of a major crop. It is confirmed. There is no doubt about it'. In response, Philip Campbell, the editor of Nature, said: 'The Chapela results remain to be confirmed. If the Mexican government has confirmed them, so be it'. [87]

In August the President of Mexico's National Institute of Ecology, confirmed that his team had found 7 per cent of the native maize plants they sampled contained genetic material that appeared to come from bioengineered corn. 'This is basically the same result that Chapela reported in his study, and both results suggested the presence of transgenic constructs in native maize varieties', he said, confirming that the paper had been submitted for publication. [88]

But two months later, the controversy took a new twist when the Mexican press announced that Nature had rejected their independent studies into the GM contamination for publication. The reviewers had rejected the papers for opposing reasons. One said that the results were so 'obvious' that they did not merit publication in a scientific journal, whereas the other said the results were 'so unexpected as to not be believable'. The Nature editor said the papers had been rejected on 'technical grounds'. [89]

So over a year after the revelation of GM contamination in Mexico, the controversy continues and nothing has been done to stop the source of the contamination, but then perhaps that is what the industry wants.

Is GM contamination beneficial?

In the Joint Statement signed by Kaplinsky, Metz and Prakash there is one

paragraph that stands out as warranting further analysis: ‘It is important to recognize that the kind of gene flow alleged in the Nature paper is both inevitable and welcome.’ [90]

So GM contamination is not only inevitable but also beneficial, and it fuses together two important pro-biotech messages: that biotechnology is no more than an extension of traditional plant breeding and that because contamination is inevitable, any kind of resistance is futile. Contamination could be inevitable unless regulators act. As Nature Biotechnology candidly pointed out, ‘gene containment is next to impossible with the current generation of GM crops ”¦ gene flow from GM crops to related plants thus remain a primary concern for regulators and one that companies need to address’. [91]

Ironically it is in the biotech companies interests not to address this problem, although that is not in the interests of consumers who want choice. ‘The hope of the industry is that over time the market is so flooded [with GMOs] that there’s nothing you can do about it, you just sort of surrender’, say Don Westfall, vice-president of Promar International, a consultant to the biotech and food industries in Washington. [92]

Critics of the biotech industry cannot believe what they read in the Prakash statement. ‘It is not beneficial for the Mexican campesinos or peasants or indigenous peoples’, says Hector Magallon Larson, from Greenpeace Mexico. ‘It is not beneficial for the Mexican environment and it not beneficial for world food security.’

‘You would never say that BSE was inevitable or welcome,’ adds Alan Simpson MP, a leading critic of the industry. ‘The arrogance of it is outstanding. One of the things that Pusztai has been trying to get us to understand is what we are talking about is a completely new frontier and it’s not about plant breeding. This is being run past society and past political institutions on the basis that it is both a radical scientific advance and yet no different at all. It is unbelievably dishonest and anti-scientific.’ There are numerous reasons why the process cannot be beneficial, and one of these is the potential inherent instability of GM crops, something that was outlined in the discussion of the Pusztai saga in Chapter 5 and which Quist and Chapela still stand by. ‘It suggests that transgenic DNA can move around the genome with a range of unpredictable effects, from disruption of normal functions to modification of expressed products that become toxic agents to the generation of new strains of bacteria and viruses,’ Quist says. [93] ‘There are a lot of theoretical reasons to believe that most of the transformation events are going to be ultimately unstable, particularly as they have been put in another environment’, adds GM specialist

Dr Michael Hansen from the US Consumers Union.

The fact that many biotech scientists have signed on to a statement that says that GM contamination is inevitable, underpins the theory that many of the industry's critics and analysts have felt for some time. They believe that the industry has deliberately set out to contaminate both non- GM and organic crops with the implicit or explicit intention of making contamination inevitable. All hope of another alternative agriculture system simply vanishes and once that vanishes, the anti-GM fight becomes hopeless.

'I think the industry now recognise that hopelessness is their best hope', adds Alan Simpson. 'They have manifestly failed to convince the public of either the desirability or safety of GM products. Having failed to convince, having failed to co-opt or to buy the public support, they are left with coercion. Coercion comes in two forms. One is putting an arm lock over the farmers and the other is putting a choice lock on consumers.'

But it is not just the critics who argue that contamination is a deliberate policy. Dan McGuire, Program Director to the 2002 Annual Convention of the American Corn Growers Association: 'I believe that the biotech companies that market GMO seed would like to see the grain marketing system totally taken over and "contaminated" by GMOs. I expect they would see that as ending their problem'. [94]

With widespread GM commercialization, GM contamination is inevitable. There have now been episodes of GM contamination in Argentina, Austria, Bolivia, Brazil, Canada, Colombia, France, Germany, Greece, Holland, India, Japan, Korea, Luxembourg, Mexico, New Zealand, Sweden, Thailand, the UK and the USA, amongst others. [95] The health and environmental impact of these contamination episodes is unknown. But waiting in the wings are the second-generation crops, those with health and nutritional benefits, and third generation crops with industrial, or pharmaceutical properties, known as pharm crops. These include vaccines, growth hormones, clotting agents, industrial enzymes, human antibodies, contraceptives and abortion-inducing drugs. [96]

Scientists believe that work needs to be done to stop pharm crops which are already being grown from contaminating other crops. If these are not contained, the US National Academy of Scientists warn that 'it is possible that crops transformed to produce pharmaceutical or other industrial compounds might mate with plantations grown for human consumption, with the unanticipated result of novel chemicals in the human food supply'. [97]

Dr Norman Ellstrand, a professor of genetics at the University of California, Riverside, and a leading expert on corn genetics, says that 'if just 1 percent of [American] experimental pollen escaped into Mexico, that means those landraces could potentially be making medicines or industrial chemicals or things that are not so good for people to eat. Right now, we just don't know what's in there'. [98]

Others are worried too. 'Most people are assuming that plants being used for these purposes [bio-pharming] will not enter the food supply, but if you assume that you need to have controls in place to make sure that does not happen,' says Michael Taylor, who used to work for the FDA and Monsanto. Some are more blunt: 'Just one mistake by a biotech company and we'll be eating other people's prescription drugs in our corn flakes', argues Larry Bohlen, from Friends of the Earth in the USA. [99]

It is not clear yet who will bear the ultimate responsibility for GM contamination, but it is likely to be the consumer. As we wait to find out, it is worth looking at another part of the fall-out from the Mexican maize fiasco. Ignacio Chapela believes that one of the reasons he was attacked is because he had opposed the corporate of alliance between Berkeley and Novartis; that he had opposed the corporatization of science. But it is not only in the USA that it is happening.

Notes

1 Nature Biotechnology (2002) 'Going With the Flow', Vol 20, No 6, June, p527.

2 Platoni, K (2002) 'Kernels of Truth', East Bay Express, San Francisco, 29 May.

3 BioDemocracy News (2002) 'Frankencorn Fight: Cautionary Tales', No 37, January, p1.

4 National Research Council (2002) Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation, Committee on Environmental Impacts Associated with the Commercialization of Transgenic Plants, Board on Agriculture and Natural Resources, Division on Earth and Life Studies, National Academy Press, Washington.

5 Quist, D and Chapela, I (2001) 'Transgenic DNA Introgressed into Traditional Maize Landraces in Oaxaco, Mexico', Nature, London, Vol 414, 29 November, p541.

6 University of California Berkeley (2001) Transgenic DNA Discovered in Native

Mexican Corn, According to a New Study by UC Berkeley Researchers, Press Release, 28 November; Quist and Chapela (2001) op cit, pp541 542.

7 Quist, and Chapela (2001) op cit, p542.

8 ETC Group (2002) GM Fall-out from Mexico to Zambia: The Great Containment The Year of Playing Dangerously, Winnipeg, 25 October.

9 University of California Berkeley (2001) op cit.

10 Chapela, I (2002) Interview with Author, 1 March.

11 BBC Radio 4 (2002) 'Seeds of Trouble', 7 January

12 Dalton, R (2001) 'Transgenic Corn Found Growing in Mexico', Nature, London, Vol 413, 27 September, p337.

13 Ferris, S (2002) 'Battle Lines Drawn in Mexico; Native Corn too Sacred to "Infect"?' The Atlanta Journal and Constitution, 28 February.

14 Quist and Chapela (2001) op cit, p541.

15 Dalton (2001) op cit.

16 Quist and Chapela (2001) op cit, p543.

17 Yang,S (2001) Transgenic DNA Discovered in Native Mexican Corn, According to a New Study by UC Berkeley Researchers, University of California Press Release, 29 November.

18 Press, E and Washburn, J (2000), 'The Kept University', The Atlantic Monthly, Vol 285, No 3, pp39 54.

19 See Rowell, A (1996) Green Backlash Global Subversion of the Environment Movement, Routledge, London, New York.

20 Murphy, M (2001) Subject: Mexican Corn the new Starlink-Monarch-Mutant Scare Story, Posted on the AgBioView site on the 29 November.

21 Smetacek, A (2001) Subject: Ignatio Chapela Activist FIRST, Scientist Second, posted on the AgBioView site on 29 November.

22 MacGregor, B (2001) Re: Genetically Modified Material Found in Mexican

Corn, posted on AgBioView list on 30 November.

23 Mann, C (2002) 'Has GM Corn "Invaded" Mexico?', Science, Vol 295, p1617, 1 March.

24 Kinderlerer, J (2001) Regarding AGBIOVIEW: Chapela and Mexican corn, China, New Zealand support up, Lomborg, Peanut map, Posted on the AgBioView list on 1 December.

25 http://www.foxbghsuit.com/wwwboard/messages/1168.html (http://www.foxbghsuit.com/wwwboard/messages/1168.html)

26 See www.bivings.com

27 http://www.bivingsreport.com/search_view_full_article.php?article_id=73 (http://www.bivingsreport.com/search_view_full_article.php?article_id=73)

28 Rowell, A (2002) 'Seeds of Dissent', The Big Issue South West, 15 21 April, pp16 17.

29 Ibid.

30 Copies of the emails provided to the author by the The Ecologist.

31 Rowell (2002) op cit.

32 Platoni (2002) op cit; Monbiot, G (2002) 'The Fake Persuaders', The Guardian, London, 14 May, p15.

33 Rowell (2002) op cit; Matthews, J (2002) 'Amaizing Disgrace', The Ecologist, London, Vol 32 No 4, May.

34 Bivings Group (2002) Statement on the Ecologist story entitled 'Amaizing Disgrace', May.

35 Bivings, G (2002a) 'Bivings: We Condemn Online Vandalism', Letter to The Guardian, 12 June.

36 BBC Newsnight (2002) 'Row Over GM Crops Mexican Scientist Tells Newsnight he was Threatened Because He Wanted to Tell the Truth', London, 7 June.

37 Bivings, G (2002b) 'The Maize Feud', New Scientist, 6 July.

38 Rowell (2002) op cit; Monbiot (2002) op cit; Matthews (2002) op cit; Bivings (2002a) op cit.

39 The original article was posted as the The Bivings Report (2002) Viral Marketing: How to Infect the World, 1 April.

40 Platoni (2002) op cit.

41 Bivings Report (2002) Viral Marketing: The New Word of Mouth, 1 November.

42 The Monsanto sites listed before the changes were Monsanto Corporate, Monsanto Africa; Monsanto France; Monsanto Fund; Monsanto India; Cornfacts; Monsanto Pakistan; Monsanto Spain; Monsanto UK; BioTech Basics; BioTech terms; Biotech Knowledge Centre; Monarch Info; Report on Sustainable Development and Teaching Science.

43 See cffar.org

44 Philipkoski, K (2002) 'A Dust-Up Over GMO Crops', Wired News, 12 June.

45 The New York Times (1999) 'Biotech Companies Take on Critics of Gene-Altered Food', 12 November; The Wall Street Journal (1999) 'Monsanto Fails Trying to Sell Europe on Bioengineered Food', 11 May.

46 Prakash,C (2002) Interview with Author, April.

47 Smetacek,A (2000) A Plea to Stop Eco-Terror, 21 July.

48 Rowell (2002) op cit.

49 Del Porto, D (2002) Interview with Author, Bivings, April.

50 http://www.v-fluence.com/about/team.html. (http://www.v-fluence.com/about/team.html.)

51 Bivings Group (2001) A Look Into the Future of Online PR, January.

52 Byrne, J (2001) Protecting Your Assets: An Inside Look at the Perils and Power of the Internet, a Presentation to the Ragan Communications Strategic Public Relations Conference, V-Influence, 11 December.

53 ETC Group (2002) GM Pollution in the Bank? Time for “Plan B”, News Release, Winnipeg, 4 February; Magallon Larson, H (2002) Interview with Author, 5 March.

54 Mann, C (2002) ‘Has GM Corn Invaded Mexico?’ Science, Vol 295, 1 March, p1617; Magallon Larson, H (2002) op cit.

55 Transgenic Research (2002) ‘No Credible Evidence is Presented to Support Claims that Transgenic DNA was Introgressed into Traditional Maize Landraces in Oaxaca, Mexico’, Editorial, 11, ppiii v.

56 Hansen,M (2002) Communication with Author, June.

57 EPA (2001) Bt Plant-Pesticides Biopesticides Registration Action Document, Washington, 15 October, pIIA3.

58 Posted on the NGIN website on 27 February, 2002; http://www. (http://www./) ngin.org.uk

59 Rowell (2002) op cit.

60 Lepkowski W (2002) ‘Biotech’s OK Corral’, Science and Policy Perspectives, No 13, 9 July.

61 Ibid.

62 ETC Group (2002) UnNatural Rejection? The Academic Squabble Over Nature Magazine’s Peer-Reviewed Article is Anything but Academic, News Release, Winnipeg, 19 February.

63 Avery,A (2002) Joint Statement from Scientists? 21 February.

64 Prakash, C (2002) Joint Statement of Scientific Discourse in Mexican GM Maize Scandal, 24 February.

65 Nature (2002) ‘Editorial Note’, 4 April.

66 Webber, J (2002) Interview with Author, 4 April.

67 Campbell, P (2002) Letter to The Guardian, 15 May.

68 Clarke, M (2002) ‘Suggestion on Mexican Maize Article,’ Email to Kate O’Connell, 10 June.

69 Platoni (2002) op cit.

70 Chapela, I (2002) And Yet it Moves, Letter to The Guardian, 24 May.

71 Suarez, A et al (2002) 'Correspondence', Nature, Vol 417, 27 June, p897.

72 BBC NewsNight (2002) 'Row Over GM Crops Mexican Scientist Tells Newsnight he Was Threatened Because He Wanted to Tell the Truth', London, 7 June; Meek, J (2002) 'Science Journal Accused Over GM Article', The Guardian, London, 8 June.

73 Metz, M and Fütterer, J (2002) 'Suspect Evidence of Transgenic Contamination', Nature, 4 April; Kaplinsky, N et al (2002) 'Maize Transgene Results in Mexico Are Artefacts', Nature, 4 April.

74 Prakash, C (2002) Joint Statement of Scientific Discourse in Mexican GM Maize Scandal, 24 February.

75 http://www.public.iastate.edu/~iazelaya/Newsletter_Vol_1_No_3-(http://www.public.iastate.edu/~iazelaya /Newsletter_Vol_1_No_3-) Addendum.pdf

76 Apel, A (2001) The Face of Terrorism, Posting to AgBioView, 18 September.

77 Metz and Fütterer (2002) op cit.; Kaplinsky et al (2002) op cit.

78 Metz, M (2001) Correspondence, Nature, Vol 410, No 513, 29 March.

79 Chapela, I (2002) Communication with the Author, 15 April; quoting the ETH magazine "ETH-Life", 25 March

80 Chapela, I (2002) Interview with Author, 1 March.

81 Worthy, K, Strohman, R and Billings, P (2002) Correspondence, Nature, Vol 417, 27 June, p897.

82 Gee, H (2002) 'Food & the Future', Nature, Vol 418, 8 August, p667.

83 Metz, M and Fütterer, J (2002) Correspondence, Nature, Vol 417, 27 June, pp897 898; Kaplinsky, N (2002) Correspondence, Nature, Vol 417, 27 June, p898.

84 Quist, D and Chapela, I (2002) Brief Communications, Nature, 4 April.

85 AgBioWorld.org (2002) Mexican Maize Resource Library.

86 Brown, P (2002) 'Mexico's Vital Gene Reservoir Polluted by Modified Maize', The Guardian, London, 19 April.

87 Clover, C (2002) '"Worst Ever" GM Crop Invasion', The Daily Telegraph, 19 April.

88 Abate, T (2002) 'Hot Seat May Cool for Berkeley Prof: Mexican Scientists Reportedly Confirm his Findings of Engineered Corn in Maize', The San Francisco Chronicle, 26 August.

89 Rosset, P (2002) Open Letter to Nature, October; Food First (2002) Nature Refuses to Publish Mexican Government Report Confirming Contamination of the Mexican Maize Genome by GMOs, Press Release, Oakland, 24 October; ETC Group (2002) GM Fall-out from Mexico to Zambia: The Great Containment The Year of Playing Dangerously, Winnipeg, 25 October.

90 Prakash, C (2002) Joint Statement of Scientific Discourse in Mexican GM Maize Scandal, 24 February.

91 Nature Biotechnology (2002) op cit, p527.

92 Laidlaw, S (2001) 'Starlink Fallout Could Cost Billions', The Toronto Star, Toronto, 9 January.

93 Pearce, F (2002) 'The Great Mexican Maize Scandal', New Scientist, London, 15 June.

94 McGuire, D (2002) Farmer Choice Customer First When it Comes to GM Crops, Presentation to 2002 Annual Convention of the American Corn Growers Association on 9 March; Washington, 13 March.

95 Villar, J (2001) GMO Contamination Around The World, Friends of the Earth International, Amsterdam; Hager, N (2002) Seeds of Distrust, Craig Potton, Nelson, pp12 20.

96 Friends of the Earth (2002) Manufacturing Drugs and Chemicals in Crops Biopharming Poses New Risks to Consumers, Farmers, Food Companies and the Environment, Washington DC, July, Executive Summary; IPS (2002) 'Host for "Pharm Crop" Experiments,' Carmelo Ruiz-Marrero, Puerto Rico, 29 October.

97 Committee on Environmental Impacts Associated with Commercialization of Transgenic Plants of the National Academy of Sciences (2002) Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation, National Academy Press, p68.

98 Schapiro, M (2002) ‘Sowing Disaster?’, The Nation, 10 October.

99 Friends of the Earth (2002) Drugs And Chemicals Will Contaminate Food Supply Concludes New Report, Press Release, Washington, 11 July.