Phantoms in the machine: GM corn spreads to Mexico

MARIE-MONIQUE ROBIN - July 3, 2010

I LANDED in Oaxaca, Mexico, in October 2006. Nestled in the heart of a lush landscape of green mountains, the city is considered one of the jewels of the country's tourist industry. I was here, however, to investigate contaminated corn.

On November 29, 2001, the scientific journal Nature had published a study that created a stir and drew heavy fire from the St Louis headquarters of North American multinational agricultural corporation Monsanto - manufacturer of the world's best-selling herbicide, Roundup, and the world's leading producer of GMOs (genetically modified organisms). Signed by David Quist and Ignacio Chapela, two biologists at the University of California, Berkeley, it found that criollo (traditional) corn in Oaxaca had been contaminated by Roundup Ready and Bt genes. (Bacillus thuringiensis) is a bacterium that produces a protein toxic to some insects. The gene inside the bacterium - the Bt gene - is added to seeds such as corn to create genetically modified crops.

The news was particularly surprising because in 1998 Mexico had declared a moratorium on transgenic corn crops in order to preserve the extraordinary biodiversity of the plant, whose genetic cradle was Mexico. Grown since at least 5000BC, corn was the basic food for the Maya and Aztec peoples, who saw it as a sacred plant.

Travelling around the indigenous communities of Oaxaca, I encountered everywhere women drying magnificent ears of corn coloured pale yellow, white, red, violet, black, or an astonishing midnight blue. "In the Oaxaca region alone, we have more than 150 local varieties," said Secundino, a Zapotec Indian who was harvesting white corn by hand. "This variety, for example, is excellent for making tortillas. Look at this ear: it has a very good size and fine kernels, so I'll save it to plant next year."

“You never buy seeds from outside?” "No. When I have a problem, I exchange with a neighbour: I give him ears for him to eat and he gives me seeds. It's old-fashioned barter."

Do you always make tortillas with local corn?” "Yes, always," he said with a smile. "It's more nourishing, because it's of much better quality than industrial corn. Besides, it's healthier, because we farm without chemical products."

"Industrial corn" means the 6 million tonnes of corn that flood in every year from the United States, 40 per cent of which is transgenic (modified by the introduction of genetic material from another species).

"Look," said Secundino, holding out in his hand like a gift a magnificent violet ear. "This corn was my ancestors' favourite." "It existed before the Spanish conquest?"

"Yes, and now there is another conquest." "What's the new conquest?"

"The transgenic conquest, which wants to destroy our traditional corn so industrial corn can dominate. If that happens, we will become dependent on multinational corporations for our seeds. And we will be forced to buy their fertilisers and their insecticides, because otherwise their corn won't grow. Unlike ours, which grows very well without chemical products."

IGNACIO Chapela, one of the authors of the Nature study, agreed to meet me at Sproul Plaza on the Berkeley campus. "Small Mexican farmers," he said "are very conscious of the stakes raised by transgenic contamination, because corn is not just their basic food but a cultural symbol."

It was an October Sunday in 2006, and the huge campus was deserted. Only a police car drifted by like a damned soul. "That's for me," said Chapela. "I've been closely watched since this affair started, especially when there's a camera." When I looked incredulous, he went on: "You want proof? Come with me." We drove to the top of a hill overlooking San Francisco Bay. As we walked towards the lookout point, we saw the same police car, parked conspicuously at the side of the road.

"How did you find out that Mexican corn was contaminated?" I asked, rather disturbed.

"I worked for 15 years with the Indian communities in Oaxaca teaching them to analyse their environment," answered the Mexican-born biologist, who had worked for the Swiss company Sandoz for several years. "David Quist, one of my students, went there to run a workshop on GMOs. To explain the principles of biotechnology, he suggested that they compare the DNA of transgenic corn, from a can of corn he brought from the United States, with that of a criollo variety meant to serve as a control, because we thought it was the purest in the world. Imagine our surprise when we discovered that the samples of traditional corn contained transgenic DNA. We then decided to conduct a study, which confirmed the contamination of criollo corn."

On September 18, 2001, the Mexican environment minister announced that his experts had done tests in 22 farming communities and found contaminated corn in 13 of them, with a level of contamination between 3 and

10 per cent. A few months later Ignacio Chapela and David Quist became a focus of attention, probably because of the reputation of Nature, which published their article in late November. When they'd submitted the article to the journal eight months earlier, the two scientists had received compliments on the quality of their study, and the article was sent to four reviewers, who approved it. But as a local paper, the East Bay Express, pointed out in May 2002: "No one could have predicted the magnitude of the controversy to come." The result was a veritable media lynching, largely organised from St Louis.

"First," Chapela told me, "you have to understand why the study provoked the wrath of the unconditional promoters of biotechnology. It contained two revelations: the first concerned genetic contamination, which really surprised no one, because everyone knew it was bound to happen, including Monsanto, which always merely confined itself to minimising the impact."

"But," Chapela went on, "the second point of our study was much more serious for Monsanto and similar companies. In investigating where the fragments of transgenic DNA were located, we found that they had been inserted into different places in the plant genome in a completely random way. That means that, contrary to what GMO producers claim, the technique of genetic engineering is not stable, because once the GMO cross-pollinates with another plant, the transgene splits up and is inserted in an uncontrolled way. The most virulent criticisms were particularly focused on that part of the study, denouncing our technical incompetence and our lack of expertise to evaluate this type of phenomenon."

The fact that "the transgenes were unstable" had "profound" implications, according to an article in Science in February 2002: "Because a gene's behaviour depends on its place in the genome, the displaced DNA could be creating utterly unpredictable effects."

The very day Quist and Chapela's article was published in Nature, November 29, 2001, a woman named Mary Murphy sent an email to the pro-GMO science website AgBio World in which she wrote: "The activists will certainly run wild with news that Mexican corn has been 'contaminated' by genes from GM corn … 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 … Not exactly what you'd call an unbiased writer."

The same day, a person named Andura Smetacek posted on the same website a comment titled "Ignatio [sic] Chapela - activists FIRST, scientist second", in which she had no qualms about spreading lies: "Sadly the recent publication by Nature magazine of a letter (not a peer-reviewed research article subject to independent scientific analysis) by Berkeley Ecologist Ignatio Chapela are being manipulated by anti-technology activists (such as Greenpeace, Friends of the Earth, and the Organic Consumers Association) with the mainstream media to falsely suggest some heretofore undisclosed ill associated with agricultural biotechnology …"

At the time the "smear campaign" that derailed Chapela's career was getting under way, Jonathan Matthews came upon these strange posts by chance. Matthews was the head of GMWatch, an information service on GMOs based in England. "Who is behind AgBio World?" I asked.

"Officially it's a non-profit foundation that claims 'to provide science-based information on agricultural biotechnology issues to various stakeholders across the world', as its website declares," Matthews said. "It's run by Professor Channapatna S. Prakash, director of the Centre for Plant Biotechnology Research at Tuskegee University in Alabama. Originally from India, he is an adviser to USAID, and in that capacity, he has intervened frequently in India and Africa to promote biotechnology.

"AgBio World had no qualms about accusing environmentalists on its website of 'fascism, communism, and terrorism, including genocide'. One day, when I was consulting the AgBio World archives, I received an error message giving me the name of the server that hosts the site: apollo.bivings.com. The Bivings Group, based in Washington, is a communications company, one of whose clients is Monsanto, and it specialises in internet lobbying."

"Do you know who Mary Murphy and Andura Smetacek are?" I asked, feeling as though I were in the midst of a detective novel. "Well," the director of GMWatch said with a smile, "The Guardian, to which I sent my findings, summed it up well: they are 'phantoms' or 'fake citizens'."

Meanwhile, the "conspiracy", as The Ecologist called it, had borne fruit. On April 4, 2002, after failing to persuade Quist and Chapela to retract their article, Nature published an "unusual editorial note", constituting an

"unprecedented disavowal" in the 133-year history of the celebrated journal. "The evidence available is not sufficient to justify the publication of the original paper," the journal wrote.

Nature's "back-pedal" was particularly surprising because a month earlier Science had reported that "two teams of Mexican researchers had confirmed biologist Ignacio Chapela's explosive findings". Directed by Exequiel Ezcurra, the highly respected director of the Mexican National Institute of Ecology, one of the studies had analysed samples of corn taken from 22 communities in Puebla and Oaxaca. Genetic contamination ranging from 3 to 13 per cent had been found in 11 of them, and with contamination levels of 20 to 60 per cent in four others. Ezcurra submitted an article to Nature, which rejected it in October 2002. "This rejection is due to ideological reasons," he stated.

MEANWHILE, Chapela had paid a heavy price: in December 2003, the Berkeley administration informed him that it had denied him tenure despite the 32-1 vote in favour by his department; he would have to leave the university at the end of his contract six months later. He filed suit and won in May 2005: "Since then," he told me, "I bear the burden of being known as a whistleblower. I have no funding to conduct the research that interests me, because in the United States now you can't work in biology if you don't accept funding from biotechnology firms."

Unfortunately, I was unable to meet the former director of the Mexican National Institute of Ecology, but I was surprised to find that in August 2005 he had co-signed a study published in Proceedings of the National Academy of Sciences. Conducted at Washington University in St Louis, the study found an "absence of detectable transgenes in local landraces of maize in Oaxaca".

But in October 2006 I did meet one of his colleagues, Dr Elena Alvarez-Buylla, in her laboratory at the institute. "How do you explain the fact that Dr Ezcurra signed a study that contradicts his previous work to such an extent?" I asked. "Only he knows," the biologist answered cautiously.

"Since then," however, Alvarez-Buylla told me, "my laboratory has carried out another study … that found that the national level of contamination is on average from 2 to 3 per cent, depending on the type of transgene, with some much higher peaks." "What do you think about this dispute?"

"I think it has nothing to do with scientific rigor and that it is masking other interests. What's important to me now is to find out the medium-term effects of the contamination on criollo corn. That's why my research team did an experiment on a very simple flower, Arabidopsis thaliana, which has the smallest genome in the plant world, into which we introduced a gene by genetic engineering. We then planted the transgenic seeds and observed their growth. We found that two genetically completely identical plants could produce very different phenotypes [floral forms]: some had flowers identical to the natural variety, with four petals and four sepals, but others had aberrant flowers with abnormal bristles or bizarre petals.

"And some were plainly monstrous. In fact, the only difference among all these plants was the location of the transgene, which was inserted completely at random, by modifying the plant's metabolism."

"What does that have to do with corn?" I asked.

"From this experimental model we can extrapolate what risks are happening when transgenic corn cross-pollinates with local varieties. It's very worrying, because there is a fear that the random insertion of a transgene may affect the genetic inheritance of criollo corn in a totally uncontrolled way."

Aldo Gonzalez, one of the leaders of the Union of Organisations of the Sierra Juarez of Oaxaca, says: "The monsters are already in our mountains."

It was a morning in October 2006, and we were on our way from Oaxaca to a Zapotec community in a remote mountain area. In 2003, he said, peasants had contacted his group because they were worried when they saw corn plants growing in their fields that "looked sick and deformed". Some were abnormally high; others had deformed ears or unusual leaves. Gonzalez came and took photos. The plant samples he had tested by a laboratory used the kits that enable European customs agents to detect transgenes in soybeans or corn imported from North America. "Every test turned out positive."

This is an edited extract from The Book “The World According to Monsanto”: Pollution, Politics and Power, by Marie-Monique Robin, translated by George Holoch, published by Spinifex Press.