Accidental Release of Genetically-modified Crops Sparks new Worries

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- **GE Failures & Contaminations** [1]

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**Stray Seeds had Antibiotic-resistance Genes**

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Keeping track: antibiotic-resistance genes are often used as markers during the production of transgenic crops such as Bt corn.

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Hundreds of tonnes of genetically modified corn seeds sold to farmers by mistake over the past four years contained a gene for antibiotic resistance, Nature has learned. The release of such genes into the environment is sometimes considered inadvisable, as there is a small chance that they could flow from crops to microorganisms and spread problems of antibiotic resistance.

The Swiss biotechnology company Syngenta admitted last week that it had accidentally released a variety of corn (maize) called Bt10 between 2001 and 2004. Like other crops with the name Bt, this corn had been genetically modified to produce a protective pesticide. But Bt10 has not been approved for sale by regulatory agencies.

Officials at the company last week argued that Bt10 is basically identical to Bt11 corn, which has been approved for sale (see Nature 434, 423; 2005). But this week, Sarah Hull, a spokeswoman for Syngenta, confirmed that a marker gene that confers resistance to ampicillin, a commonly used antibiotic, was present in the Bt10 seeds. She adds that this gene would not have been active in the corn plants that grew from the seeds.

Antibiotic-resistance genes are widely used as 'tags' during the production of genetically modified crops, to help breeders identify and preserve desirable strains. But the genes are often removed before the seeds enter the food chain. The presence of the marker gene in Bt10 corn was noted in a 2003 advice notice from a UK government committee, the Advisory Committee on Releases to the Environment, which was using Bt10 as a comparison to prove that there were no marker genes in Bt11 corn.

Critics have expressed surprise that neither Syngenta nor the US Environmental Protection Agency (EPA) announced the presence of the marker when they admitted that the release of Bt10 had taken place. "It is quite scandalous," says Greg Jaffe, head of the biotechnology project at the Center for Science in the Public Interest, a pressure group in Washington DC. "This shows that the government and the company are not being forthright."

Hull says that the company didn't mention the gene's presence because "it wasn't relevant to the health and safety discussion". She adds that the antibiotic-resistance genes have been around for a long time. "They've been studied extensively, and they pose no risk to humans or animals," she says. Regulators say that the genes present a very small risk to human health, either directly - if in the stomach of a patient on antibiotics, for example - or indirectly through gene flow into microbes.

Michael Rodemeyer, director of the Pew Initiative on Food and Biotechnology, a think-tank in
Washington DC, says that the presence of such genes would be unlikely to see a crop declared unsafe in the United States - but adds that it could cause problems in Europe.

In a ruling published last April, for example, the European Food Safety Authority, which advises European Union governments on food issues, said that marker genes conferring resistance to ampicillin "should be restricted to field trials and not be present in genetically modified plants placed on the market". And the Codex Alimentarius Commission, the international food-standards body, has urged the agricultural biotechnology industry to use alternative methods to refine genetically modified strains in the future.

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The EPA, which is jointly investigating the release of the Bt10 corn with the US Department of Agriculture, declined to say what it knew about the antibiotic-resistance marker. "What the company told us and when about the marker gene is part of our ongoing investigation and we are not able to discuss it at this time," the agency said in a statement.

"I think they've done a terrible job," says Margaret Mellon, head of the food and environment programme at the Union of Concerned Scientists in Washington DC, referring to both Syngenta and the government agencies. "There are lots and lots of unanswered questions, and the longer they remain, the less confidence people are going to have in the technology and in the regulatory system."

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