

Transgenes Escape to Taco Bell®

In September 2000, a genetically modified variety of corn, known as StarLink™, was detected in Taco Bell® taco shells. StarLink corn contains a gene known as Cry9C, which codes for a protein that makes plants resistant to certain insects. Because of a concern that this particular gene might induce allergic reactions in humans, the corn was approved for use as feed for nonhuman animals only.¹

Once the StarLink variety was detected in the taco shells, a massive recall was launched to ensure that all foods containing traces of the StarLink corn intended for human consumption were destroyed. However, despite massive efforts to destroy food products containing StarLink corn and to destroy StarLink seed stocks, the StarLink transgene was still detectable in U.S. corn supplies up to 3 years later.²

This story illustrates several very important points. First, efforts to ensure that only livestock ate StarLink corn failed. As a result of the StarLink transgene escape, the U.S. Environmental Protection Agency no longer approves transgenic plants unless they are intended for both human and animal consumption. Second, despite the massive effort, complete removal of the escaped transgene once detected was impossible. Although the prevalence of StarLink corn in the U.S. corn market has decreased dramatically as a result of massive containment efforts, it is still detectable years after having been completely banned.

Endnotes:

1. Luca Bucchini and Lynn R. Goldman, "Starlink Corn: A Risk Analysis," *Environmental Health Perspectives* 110, no. 1 (January 2002): 5-13.
2. "StarLink Test Results," Grain Inspection, Packers and Stockyards Administration, U.S. Department of Agriculture, 2003.

Timeline of Events Linked to the Escape of the StarLink™ Transgene¹

Year	Month	Event	Category
2000	Sept.	• StarLink™ corn found in taco shells.	
		• Kraft Foods announces recall of taco shells that have been found to contain StarLink corn.	
		• Aventis (the biotechnology company that produces StarLink corn) announces it will purchase entire crop of StarLink corn from this year to prevent any further use of the corn in food products.	
	Oct.	• Aventis chooses to cancel the U.S. registration of StarLink corn. This move means that StarLink corn can no longer be planted for any agricultural purpose.	
		• Aventis asks the Environmental Protection Agency (EPA) to temporarily allow the use of StarLink corn for human consumption because it has already appeared in many food products (EPA considered and later rejected this request).	
	Nov.	• The U.S. Department of Agriculture (USDA) announces plans to test corn shipments bound for Japan for the presence of StarLink grain. The move was taken to reassure consumers in Japan, the largest importer of U.S. corn, that the StarLink gene had not escaped.	
		• Aventis confirms reports that the StarLink protein (Cry9C) was present in corn hybrids having no known connection to StarLink varieties. USDA officials begin working with the companies involved to investigate the mix-up.	
	Dec.	• An EPA-appointed Scientific Advisory Panel concludes that the Cry9C protein has a medium likelihood of causing allergic reactions in humans.*	
• Because the Cry9C protein has been found in several varieties of non-StarLink hybrid corn, USDA recommends that U.S. seed companies test all their corn seed lots for the presence of the Cry9C protein.			
2001	Jan.	• Farmers whose nontransgenic crops were found to contain the Cry9C protein will be compensated for losses they may incur, under an agreement signed by Aventis and the attorneys general for 17 corn-producing states.	
	Feb.	• The president, general counsel, and vice president for market development of the U.S. crop sciences division of Aventis Crop Science are fired. A spokesperson for Aventis said it was fair to link the firings to the StarLink fiasco.	
	Mar.	• Tainted seed is found in inventories slated to be sold to corn farmers this spring. There is concern that U.S. corn exports will suffer again this year if the crop contains traces of the Cry9C protein.	
		• USDA announces that it will buy Cry9C-tainted corn seed from small seed companies that are not affiliated with Aventis and were not licensed to sell StarLink corn last year. Major seed companies and companies licensed to sell	
		• An Aventis executive estimates the amount of corn contaminated with the Cry9C protein to be 430 million bushels, far more than the amount of contaminated corn seed that will be bought by the U.S. government to prevent its being planted this spring.	

Timeline of Events Linked to the Escape of the StarLink™ Transgene¹ (continued)

Year	Month	Event	Category
2001	June	<ul style="list-style-type: none"> The Centers for Disease Control releases its finding that the transgenic protein in StarLink corn was probably not the cause of the apparent allergic reactions that have been attributed to it by people who suffered symptoms shortly after eating corn products. 	
	July	<ul style="list-style-type: none"> Stores remove from their shelves a brand of tortilla chip made from white corn because traces of StarLink corn were found in it. Makers of tortilla chips have been switching to white corn as a precaution because the Bt Cry9c transgene was incorporated only into a yellow corn variety. Avoidance of yellow corn was believed to eliminate the presence of the StarLink protein, which has been found widely—at low levels—in stores of corn destined for human consumption. 	
		<ul style="list-style-type: none"> The panel of scientists who have been advising EPA on the safety of StarLink corn declines to recommend lifting the ban on human consumption of the corn, saying it is not yet satisfied that the transgenic product is safe. 	
2002	Dec.	<ul style="list-style-type: none"> Japan's Agriculture Ministry reports that it has found traces of StarLink corn in a shipment of U.S. corn that docked at Nagoya Harbor. USDA officials say they believe the last stocks of StarLink corn were destroyed last year. 	
2003	Sept.	<ul style="list-style-type: none"> The genetically engineered (GE) gene from StarLink corn, along with the GE genes from other types of GE corn, is reported to have entered the native corn populations of Mexico. The commercial cultivation of any kind of GE corn is prohibited in Mexico because of concerns about gene flow to Mexico's indigenous corn varieties, but GE corn kernels can be imported for use as food. 	
2007	Oct.	<ul style="list-style-type: none"> EPA proposes to cease testing yellow corn for the presence of the StarLink variety after concluding that "potential exposure of the U.S. population to the Cry9C protein in StarLink corn in the current U.S. food supply is extremely low, and continued testing of corn grain by grain handlers and millers for the presence of Cry9C provides no additional human health protection."² 	

*There is no evidence that the StarLink variety of corn has caused harm to any individuals.

Endnotes:

1. "Transgenic Crops: An Introduction and Resource Guide," Department of Soil and Crop Sciences, Colorado State University, 2004, http://cls.casa.colostate.edu/TransgenicCrops/starlink_news.html.
2. "Monitoring for StarLink™ Corn to End," U.S. Environmental Protection Agency, April 2008, www.epa.gov/pesticides/biopesticides/pips/starlink_corn_monitoring.htm.