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What Does the Future Hold for the Sustainability of GMOs in Our Environment?

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What Does the Future Hold For The Sustainability of GMOs in Our Environment?

By Benjamin Flaherty, Christopher Cook, and Joseph Cartwright

What is a GMO?

- A genetically modified organism or “GMO” is any organism that has had its genome altered in an attempt to have the organism do something it couldn't before.

Where can I find GMOs?

- GMOs can be found all throughout the United States. Since 1994, GMOs have been approved and regulated by the US government for commercial use. Now, more than 90% of US agriculture is genetically modified (See Figure 1 below).

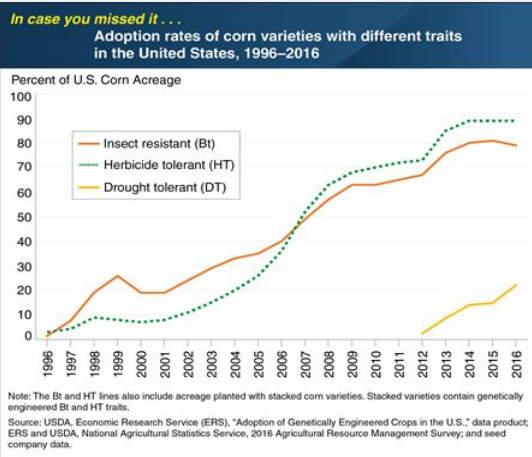


Figure 1: A graph showing the percent of U.S. corn acreage occupied by GMOs between 1996-2014

How sustainable are GMOs?

- Although cost affordable and highly productive, GMOs may not be as sustainable to the environment as we believe.
- Studies have found that corn plants who have been genetically modified to produce an insecticide called “Bt Toxin” are being overly planted (See Figure 2).
- This over planting of plants are causing many corn praying insects, such as Armyworms, to become immune to Bt Toxin.
- Immunity to this toxin could mean that there will be more Armyworms that will be feeding. This increase Armyworm feeding will affect the amount of primary producers available in the environment; thus throwing off entire food chains.



Figure 2: The structure of Bt toxin. The gene in *Bacillus thuringiensis* that codes for this toxin was modified to be produced inside certain corn plants

The Ripple Felt Across the Food Chain

- Further disruption of food chains caused by GMOs can be expected up instead of down the food chain.
- Introduction of new, genetically enhanced organisms to an environment leave all other organisms in that environment at a disadvantage.
- Take the Bt Corn plant: by introducing this new organism to an ecosystem, the regular consumers of corn have lost a food source and may start to die off.
- This die off would in theory turn into a ripple effect, affecting other trophic levels above the previous one leading to the destabilization of food chains.

Where To Go From Here?

- GMOs are still more cost affordable and can be mass produced quicker than organically grown produce. This doesn't make them sustainable though. GMOs are still in their infancy and should be treated as such. As a nation, we must be mindful of our growing habits and stay responsible when it comes to the use of GMOs for the sake of our ecosystems and their food webs. Only then can GMOs truly be sustainable in the United States.

(See sources on next slide)

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