# Effectiveness of Bt corn on kernel counts and its cost effectiveness for Delta farmers

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## Introduction

Insect pests that feed on corn kernels are one of the many pressing factors that affect corn yields. The corn earworm, *Helicoverpa zea,* feeds on corn kernels during its larval stage. The corn earworm is considered to the most economically harmful pest for Corn with annual damages upwards of $100 million USD.[2] Previous research on other specific ways to control *H. zea* were mostly unsuccessful until the introduction of *Bacillus thuringiensis.* Bt's mode of action inmaize involves the inclusion of Bt into the genome of the corn. As the plant grows, varying pests make attempts to eat the plant. However, as Bt is digested in the insect, its toxins are released and paralyze the digestive tract, leading to death. Previous testing has confirmed the effectiveness of Bt against varying pests. In these series of tests varying levels of genetic modification to the maize was carried out along with a hybrid breed and were tested against controls. The ultimate purpose of this project is to both determine how effective is Bt in kernel counts and if the cost of Bt treatments is economically feasible.

## Materials

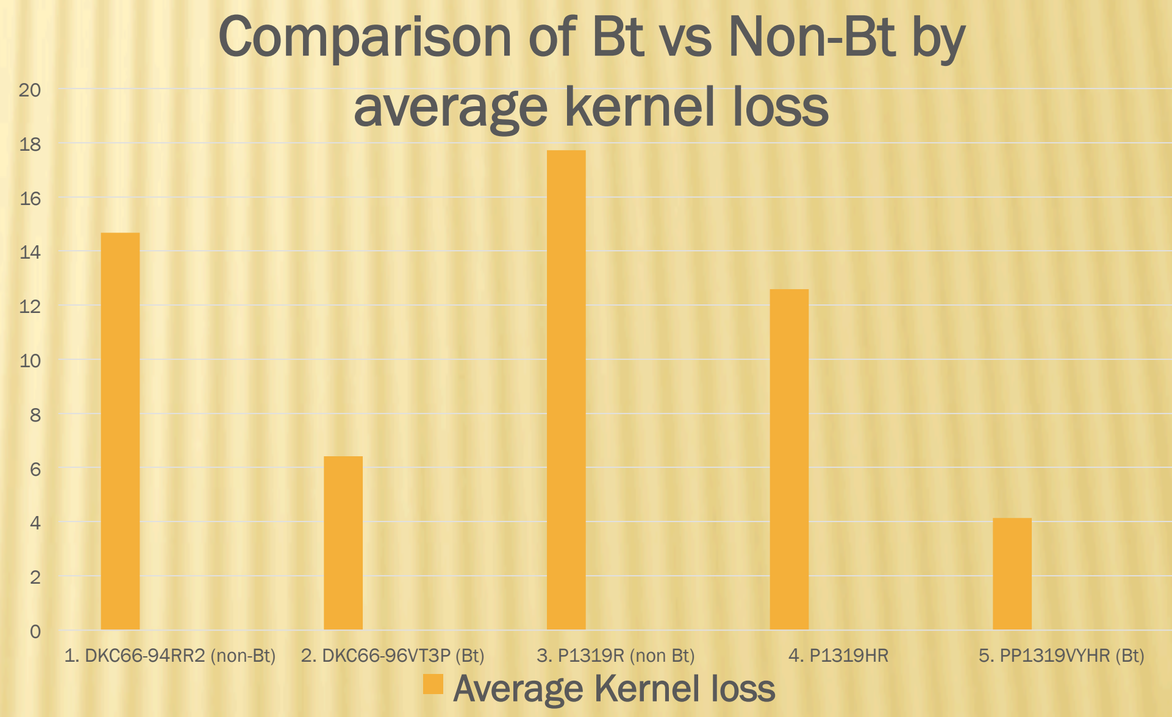
To test the effectiveness of different amounts of Bt, three Round Up Ready strains were evaluated and compared to the controls. These variants were DKC66-94RR2,  a non Bt version of Round Up Ready, P1319R, another version of Round Up Ready that was non-Bt. The Bt versions of Round Up Ready that were used were DKC66-96VT3P and PP1319VYHR. A hybrid was also used in comparsonison, P1319HR. Other materials used in the testing were Corn, Soil, and other herbicides such as Lexar and Round Up that were used on both the tested and the controls.

## Methods

First plant the corn at a normal time and irrigate accordingly. Following the planting, apply herbicides and keep track of all other inputs used on each plot. To collect data on the level of kernel damage, check ten ears per plot. When checking the ten ears in each plot, determine and record the species that is infesting the ears, the level of infestation (larvae count), and determine the size of the larvae and record it as either small, medium, or large.

## Results

Bt treatments were far more effective in suppressing *H. Zea* along with other corn pests. Although the Hybrid mix did yield results that were better than non-Bt corn, the Hybrid's results were minimal when compared to a full treatment of Bt.




## Conclusion

*Helicoverpa zea*  does significant damage to corn yields, yet this damage often occurs in localized areas that were severely hit. Although Bt is very effective in dealing with *H. zea*, the cost of implementing Bt technology would only justify use in areas heavily infested with *H. zea*.[1] However, other inputs would still have to be used along with Bt. Thus, Bt can only be economically feasible if yields would be dramatically reduced without the use of Bt. Bt is a more effective approach to greater yields, but the added technology costs in most cases would not justify the returns unless the growing area is under great risk of *H. zea* infestation. Other concerns dealing with the implementation of Bt technology would be the lack of markets to sell Bt corn due to current restrictions on GMOs across most of the developed world.[3]

## References

1. "Should I plant Bt corn?" Mississippi Extension Service and Experiment Station - Mississippi State University (MAFES) (MS) (Cooperative). N.p., n.d. Web. 27 July 2014.
2. Capinera, John L. Handbook of Vegetable Pests. San Diego, Calif: Academic Press, 2001. Print.
3. "5 reasons to keep the world GM-free."- San Francisco State University. N.p., n.d. Web. 27 July 2014.