

## How insects evolve resistance to GMO Bt cotton

An international team has discovered what happens on a molecular basis to insects that evolved resistance to genetically modified cotton plants. Their findings shed light on how the global caterpillar pest called pink bollworm overcomes biotech cotton, which was designed to make the organic insect-killing bacterial protein called Bt toxin. The results could have major impacts for managing pest resistance to Bt crops.

Based on laboratory experiments aimed at determining the molecular mechanisms involved, scientists knew that pink bollworm could evolve resistance against the Bt toxin, but they had to go all the way to India to observe this happening in the field. Farmers in the U.S., but not in India, adopted tactics designed to prevent evolution of resistance in pink bollworm.

The emergence of resistant pink bollworm in India provided the researchers an opportunity to test the hypothesis that insects in the field would evolve resistance to Bt toxin by the same genetic mechanism found previously in the lab. In the lab strains, the scientists had identified mutations in a gene encoding a protein called cadherin. Binding of Bt toxin to cadherin is an essential step in the intoxication process. Mutations that disrupt cadherin block this binding, which leaves the insect unscathed by the Bt toxin.

“Many mechanisms of resistance to Bt proteins have been proposed and studied in the lab, but this is the first analysis of the molecular genetic basis of severe pest resistance to a Bt crop in the field,” said Bruce Tabashnik, one of the paper’s authors and the head of the Department of Entomology in the UA College of Agriculture and Life Sciences.

**Read the full, original article:** [The Genetic Basis Of Evolved Resistance To GMO Cotton In India](#)