GM crops protect neighbors from pests

September 18 2008

A study in northern China indicates that genetically modified cotton, altered to express the insecticide, Bt, not only reduces pest populations among those crops, but also reduces pests among other nearby crops that have not been modified with Bt. These findings could offer promising new ideas for controlling pests and maximizing crop yields in the future. The report will be published by the journal *Science* on Friday, 19 September.

Dr. Kong-Ming Wu from the Chinese Academy of Agricultural Sciences in Beijing and colleagues analyzed data from 1997 to 2007 about the agriculture of Bt cotton in six provinces in northern China, covering 38 million hectares of farmland cultivated by 10 million resource-poor farmers. They compared that information with data on pest populations in the region, focusing on the cotton bollworm, a serious pest for Chinese farmers.

The researchers' results show that populations of the cotton bollworm were dramatically reduced with the introduction of Bt cotton, especially during the period from 2002 to 2006. They considered the contribution of temperature and rainfall along with the introduction of the genetically modified cotton, and confirmed that Bt cotton was responsible for the long-term suppression of the pests in the cotton and a host of other un-modified crops after 10 years. Dr. Wu and colleagues suggest that this may be because cotton is the main host for bollworm eggs, and reducing larval populations in the cotton consequently reduces the entire population and protects other crops.

Bt is an insecticide derived from the spores and toxic crystals of the bacteria Bacillus thuringiensis, and has been sold commercially since 1960. It is considered non-toxic to humans, animals, fish, plants, micro-organisms, and most insects. However, it is highly selective and lethal to caterpillars of moths and butterflies. Bt is currently registered and marketed for use as an insecticide in more than 50 countries worldwide. It does not contaminate groundwater because it degrades so rapidly.

The authors say that Bt technology gives China a new tool for pest control, and that all farmers in a Bt cotton-planting region will experience the benefits. "In 1992, cotton bollworms caused about a 30 percent loss in the cotton yield in northern China. Because of the high costs for pest control then, many farmers refused to plant cotton," said Dr. Wu in an email interview. "This case study of Bt cotton implies that other Bt crops, such as Bt rice, may also have great potential for agricultural practices in China. This success with Bt cotton could push forward the commercial processes of genetically modified crops in China."

Dr. Jian-Zhou Zhao, a co-author of the report, also highlights the health benefits of using Bt cotton. "Poisoning from other insecticides, and even death, was a big problem for cotton farmers in the 1990's," Zhou said. "Most farmers did not have proper protective clothes while applying insecticides with small backpack sprayers. This may be another reason that many farmers refused to plant cotton before Bt was available -- it was too dangerous and scary."

The use of Bt cotton and other genetically modified crops could provide a safer and more economical solution to pest control in many small farms around the world. Dr. Wu and the team of researchers, however, acknowledge that a major challenge to the success of Bt cotton is the potential for insects to evolve resistance to the insecticide. They insist that despite its considerable value, Bt cotton should still be considered

only one component in the overall management of pests.

Source: American Association for the Advancement of Science