

Issue Date: Sunday , December 12 , 2010

Worms eat into GM crop myth - Insects expected to drop dead thrive on cotton plants



New Delhi, Dec. 11: Insects expected to drop dead after feeding on genetically modified cotton plants have instead been found for the first time in India to be thriving and even successfully breeding on the plants.

Government entomologists have detected natural bollworms — pests of cotton — capable of feeding, surviving and reproducing on commercial varieties of GM cotton, and spawning progeny that can also complete a full life cycle on the plants.

The entomologists at the University of Agricultural Sciences (UAS), Raichur, Karnataka, say their observations coming within eight years after the start of commercial cultivation of GM cotton in India put a question mark on the wisdom of relying heavily on GM plants, particularly to fight crop pests.

A larva of the bollworm feeding on GM cotton plant. Credit: University of Agricultural Sciences, Raichur

“We saw virtually no differences between the biology of insect populations reared on the GM cotton and the non-GM cotton,” said Aralimarad Prabhuraj, associate professor of agricultural entomology at the UAS. The results of their studies

appeared yesterday in the journal *Current Science*, published by the Indian Academy of Sciences.

The GM cotton plants are designed to produce a bacterial protein that is toxic to bollworms. But the bollworm larvae picked up by the UAS researchers from their experimental farms in Raichur defiantly survived the toxins produced by the plants.

Previous studies from the US, China and India have shown that bollworms can feed on GM cotton plants. But the new study is the first to demonstrate that bollworms can breed on the GM cotton and produce fertile offspring that also have the same capability.

The rise of GM cotton in India has been hailed by the biotechnology industry, many crop scientists and sections of farmers as a runaway success. India’s annual cotton production has more than doubled from 2.3 million tonnes in 2002 before the introduction of GM cotton to 5.4 million tonnes in 2008. Agricultural statistics suggest that cotton productivity has also increased from 302kg per hectare to 567kg per hectare.

“We have indeed seen a dramatic boost to India’s cotton,” Prabhuraj said. “But we had always anticipated that at some point in time, we’ll encounter pests that can withstand the modified plants. No one knew when it would happen,” Prabhuraj told **The Telegraph**.

The UAS researchers said their study did not probe whether the bollworms survived because they have turned resistant to the toxin in the GM cotton plants or because the amount of the toxins in the plants are below a minimum level needed to kill the insects.

“The damage caused by the bollworms to the GM cotton plants suggests that rather than banking on GM technology alone, we need to lay emphasis on integrated pest management, or IPM,” said Yerbahalli B. Srinivasa, a team member at the Institute of Wood Science and Technology, Bangalore. In IPM, farmers are encouraged to use multiple strategies to combat pests.

Prabhuraj and Srinivasa say that without IPM, the population of insects capable of surviving GM plants may grow beyond a tipping point where the crop losses would be significant.

A senior biotechnology scientist said the UAS findings aren’t surprising.

“We’ve known for decades that insects can develop resistance,” said Shantu Shantaram, executive director of the Association of Biotechnology-Led Enterprises. “We completely agree that GM plants should be used in tandem with IPM,” Shantaram said.

A five-year study by scientists at the Indian Agricultural Research Institute in New Delhi has shown that the durability of GM cotton varieties can be extended through IPM, Shantaram said. But IPM demands regular, at times even daily, monitoring of pests in the field, and a calibrated response to the pest populations.

“This requires a lot of effort and labour, and not all farmers may be able to practise this,” Shantaram said.

The UAS study observed survival and breeding of bollworms on both first-generation as well as a second-generation GM cotton. The second-generation varieties are loaded with two toxins, and thus viewed as a superior alternative to GM cotton with only one toxin.