

# Bt is Not the Culprit

Shanthu Shantharam and CS Prakash, BioSpectrum (India), June 15, 2006  
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There is a sensational headline grabbing lots of media attention lately: sheep are dying in India by eating Bt cotton leaves!

Bt protein such as in the genetically modified (GM) cotton in India has been extensively tested in feeding trials and consumed in hundreds of millions of meals by not only livestock but also humans. There has not been a single problem ever, much less a fatality. This suggests one might want to look for a more likely culprit. In this case, as soon as one does that, the culprit seems to leap out-conventional pesticide poisoning. Or even the natural toxins that are abundant in cotton leaves.

The sheep-death-by Bt Cotton-story is the latest scandalous report from the Center for Sustainable Agriculture (CSA) of Secunderabad, a "dyed-in-the-wool" group of activists who are hell bent on stopping Indian agriculture on its track to progress. They claim that hundreds of sheep died after eating leaves of Bt cotton, a crop that has been genetically modified (GM) to protect against insect attack. A close examination of the issue reveals that pesticide poisoning or the natural toxins in the cotton leaves rather than the Bt protein are the likely culprits here.

The CSA report does not offer any scientific evidence to suggest the culpability of the engineered insecticidal protein in the cotton plants in the sheep mortality. While CSA calls its report preliminary, they have no compunction to blow it all out of proportions in an orchestrated effort to scare the public.

Media and Internet discussion groups are abuzz with this story convicting Bt cotton of sheep death even without a trial. It is clearly a mischievous and cheap attempt to denigrate and discredit the Bt technology by anti-GM groups to fulfill their avowed goal of making India "GM-free" and rid of modern biotechnology that promises so much for our farmers and consumers.

Indeed, it is refreshing that the state government veterinarian who conducted post-mortem on four to five sheep came to a scientifically reasonable conclusion that the sheep deaths may be due to insecticide poisoning. The autopsy reports show tell-tale signs of pesticide poisoning and the treatment prescribed by the veterinary doctor are atropine and prednisolone, a standard treatment for pesticide-poisoning from organophosphorous and carbamate insecticides.

Dr Richard Roush, an internationally recognized scientist on Bt crops at the University of California (Davis), concurs that poisoning from pesticides or natural plant toxins is the likely cause of sheep death in India, and adds "These anti-GM activists, for their own ideological aims, are taking advantage of local ignorance to try to scare people off from crops that have significant health and environmental benefits. There is least effort to find the real causes."

Dr Sonny Ramaswamy, an entomologist and Director of Agricultural Research Programs at Purdue University (USA), also suspects that natural plant toxins such as gossypol or other alkaloids found in cotton leaves or foliar-applied pesticides may have contributed to the sheep fatality.

There are many other troubling questions here: why are these claims coming from only the anti-GM activists? Why weren't objective animal scientists engaged? Why is the "situation" limited to Andhra Pradesh? Why hasn't this happened anywhere else? Why do published animal feeding studies with Bt crops not show any harmful effects?

While the actual case of sheep mortality in India must be investigated thoroughly, one can easily exonerate the Bt protein as blameless. Bt protein is present in miniscule amounts in cotton leaves whose action is so specific that it does not even damage other insects than its target, the cotton bollworm. Dozens of toxicology and biosafety studies show that Bt protein in GM crops is extremely safe. Mammals (higher animals and humans) do not have receptors for the Bt toxin unlike target lepidopterans like bollworm. Tests carried out by scientists in India and abroad on sheep, goats, buffalos, cows, rabbits, birds and fish have confirmed the safety of Bt protein beyond doubt.

Bt crops have been grown in dozens of countries across the world in the past ten years over hundreds of millions of hectares. There has never been a single credible report of damage to human or animal health or the environment from approved GM crops or the foods derived from them. Unlike conventional crops, biotech-derived crops are subjected to extremely rigorous safety-testing, and are continuously monitored after their commercialization.

Bt protein in cotton leaves thus is not the culprit of sheep demise. There is nothing in the report of CSA to suggest a direct cause and effect relationship between Bt protein and the death of sheep. Yet, they have made scandalous headlines just to mislead the public.

This needless sensationalization to disparage a highly effective and successful pest-control technology is nothing but political propaganda to scare Indian farmers from using it. Bt cotton technology is a proven technology that is helping farmers around the world including India to grow more crops in an environmentally-friendly manner by reducing millions of kilograms of pesticide.

While the opponents of GM technology cannot produce any scientific or credible evidence that these crops are unsafe, they would not miss any chance to indict the technology with contrived fears. It is easy to dismiss such impish and irrational propaganda but unfortunately the anti-GM activists know too well that the fear-sensation is easy to sell to the gullible public and policy makers.

Every toxicologist knows that "dose makes a poison", a dictum conveniently ignored by groups opposed to biotechnology. Just last year, the anti-GM zealots in India went to town crying hoarse and waving a scientific paper published by Keshav Kranthi of the Central Institute of Cotton Research in Nagpur (Kranthi, 2006; Kranthi et al., 2005; Shantharam & Rao, 2006) that these same varieties of Bt cotton did not produce sufficient quantities of Bt toxin to control cotton bollworm. Now, these same activists are suggesting that harvested leaves of Bt cotton (where Bt toxin should

have suffered sufficient degradation) have so much toxin in them to kill a huge animal like sheep when compared to the tiny cotton bollworm.

This just shows that 'die-hard' opponents of modern biotechnology will go to any length to weave whatever story to suit their political agenda. They are doing a great disservice to the farmers of India by preaching falsehoods and preventing them from using modern technologies that they so badly need and deserve.

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**Kranthi, K.R. (2006)**

On the variability of Cry1Ac expression in commercialized Bt cotton varieties in India - Response. Current Science, 90, 9, pp 1171-1172  
<http://www.botanischergarten.ch/Cotton/Kranthi-Cotton-2005-reply.pdf>

**Kranthi, K.R., Naidu, S., Dhawad, C.S., Tatwawadi, A., Mate, K., Patil, E., Bharose, A.A., Behere, G.T., Wadaskar, R.M., & Kranthi, S. (2005)**

Temporal and intra-plant variability of Cry1Ac expression in Bt-cotton and its influence on the survival of the cotton bollworm, *Helicoverpa armigera* (Hubner) (Noctuidae : Lepidoptera). Current Science, 89, 2, pp 291-298  
<http://www.botanischergarten.ch/Cotton/Kranthi-Cotton-2005-orig.pdf>

**Shantharam, S. & Rao, C.K. (2006)**

On the variability of Cry1Ac expression in commercialized Bt cotton varieties in India. Current Science, 90, 9, pp 1170-1171  
<http://www.botanischergarten.ch/Cotton/Shantharam-cotton-2005-comment.pdf>