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**The science of Bt cotton failure in India**

**Field Data reported by GENE CAMPAIGN**

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A new report published by scientists at the Central Institute for Cotton Research (CICR), Nagpur, in the 25 July issue of Current Science. The study conducted at India's premier cotton research institution gives the scientific reasons for the failure of the Monsanto Bt cotton varieties and shows that India's Bt cotton technology is faulty and will fail to protect against the bollworm.

The CICR study validates the principal findings made by Gene Campaign and other groups like Greenpeace and Center for Sustainable Agriculture, that pesticide savings are not significant in India; that protection offered by Bt cotton lasts only for part of the plant's life cycle and most critically, that bollworm readily attack the bolls because Bt toxin expression was below effective levels in the economically most important part of the plant.

Most alarmingly, the CICR study shows that Bt cotton cannot be effective in India because the major cotton pest here, the bollworm, is not susceptible to the Cry1Ac toxin of Bt cotton. Cry1Ac works against the tobacco budworm, (*Heliothis virescens*) which is the major pest of cotton in USA. Bt cotton varieties in USA kill 99-100 % of the budworm pest, hence they are successful.

The CICR study further suggests that poor Bt cotton performance in India is also due to the fact that here, Bt cotton is being produced as hybrids containing only one copy of the Bt gene, as against the true breeding varieties containing two copies of the Bt gene which are produced in other countries like China, Australia and South Africa. Global analysis of Bt cotton shows that true breeding Bt cotton varieties perform better than hybrids.

Indian regulators must answer why they are promoting Bt cotton hybrids that are expensive and will force farmers to buy seeds for every new planting? Why does India's top decision making body, the Genetic Engineering Approval Committee (GEAC), not decide that only true breeding varieties of Bt cotton would be permitted in India, not just because they perform better but also because they would be a cheaper option for farmers who could save seeds for the next harvest?

The information about the defects in India's Bt technology was available to the ICAR at the end of the 2003, when widespread failures were reported by a number of agencies, including the State Government of Andhra Pradesh. The Director General of ICAR is an ex officio member of the GEAC and yet did not raise his voice about the clear cut scientific evidence that an ICAR institution had provided that the Cry1Ac based Bt technology would not succeed in India and that the Bt cotton should be held back till a better technology could be developed. Instead, the GEAC has continued to release Bt cotton varieties for many other parts of India, without conducting any review on its failures.

What the GEAC is doing with respect to Bt cotton amounts to criminal negligence. Its biased decisions are resulting in debilitating losses for poor farmers, specially in rain-fed areas. The members of the GEAC must be held accountable for the losses faced by farmers, sometimes leading them to taking extreme steps. The government has remained unmoved by reports of crop failures and impervious to demands that a thorough review be undertaken of the Bt cotton performance in India, before proceeding any further with it. It continues to commit offences against farmers by allowing a substandard product to be sold to them.

Gene Campaign has now issued a notice to the Ministry of Environment and Forests to file a complaint for commission of offences under the Environment Protection Act and the Rules framed under it, to regulate genetically modified organisms (GMOs). India's top decision making body, the GEAC (Genetic Engineering Approval Committee) had full knowledge of the CICR studies and the ineffectiveness of the Bt technology being used. Yet, despite this and widespread reports of failure of Bt cotton, far from revoking the approval granted to the Mahyco-Monsanto varieties, it continued to grant approval to several other Bt cotton varieties for cultivation.

The National Commission on Farmers must recommend that Bt cotton hybrids be withdrawn from the fields and a moratorium placed on any further cultivation of Bt cotton until the technology is made relevant to Indian pests and Indian agricultural conditions. Mahyco -Monsanto must be made to pay compensation for losses incurred by farmers. Also, Bt cotton must be permitted in India only in the form of true breeding varieties like is the case in China, Australia and South Africa, not as hybrids the way industry is pushing here.