

**Submitted to Current Science as RESEARCH COMMUNICATION**

**Non *Bt* seeds provided by seed companies in India- are they suitable as refuge for *Bt*-cotton?**

**S. Kranthi<sup>\*</sup>, U. Satija, P. Pusadkar, Rishi Kumar<sup>1</sup>, C. S. Shastri, S. Ansari, H. B. Santosh, D. Monga<sup>1</sup> and K. R. Kranthi**

*Author's affiliations:*

ICAR – Central Institute for Cotton Research, Post Bag No. 2, Shankar Nagar P.O., Nagpur 440 010 Maharashtra, INDIA.

<sup>1</sup>ICAR – Central Institute for Cotton Research, Regional Station, Sirsa - 125 055, Haryana, INDIA

\* Corresponding author: [sandhya.kranthi@gmail.com](mailto:sandhya.kranthi@gmail.com) 9923051496 (m)

<b>U. Satija</b>	<a href="mailto:usat0701@gmail.com">usat0701@gmail.com</a>
<b>P. Pusadkar</b>	pratikpusadkar2010@gmail.com
<b>Rishi Kumar<sup>1</sup></b>	rishipareek70@yahoo.co.in
<b>C. S. Shastri</b>	shastrychandrashekhar@gmail.com
<b>S. Ansari</b>	sheeba.ansari87@gmail.com
<b>H. B. Santosh</b>	santoshgpb@gmail.com
<b>D. Monga<sup>1</sup></b>	dMonga2009@gmail.com
<b>K. R. Kranthi</b>	krkranthi@gmail.com

## ABSTRACT

Cultivation of non *Bt*-cotton plants in close vicinity of *Bt*-cotton plants serves as 'refuge' for insects that are susceptible to *Bt*-cotton. Adoption of refuge is important for Bollgard and Bollgard II hybrid cotton to ensure sustainability of the *Bt*-cotton technology in India. The Ministry of Environment stipulated that a packet of 120g non-*Bt* cotton seeds or 200g of pigeon pea should be provided for refuge planting along with 450g of *Bt*-cotton seeds. Compliance of refuge planting is reportedly very poor in India. Quality of refuge seed in commercial *Bt* hybrid seed packets being sold in the open market was assessed for their technical suitability as refuges. This communication reports the findings about refuge non compliance by seed companies with respect to presence of the *Bt* trait in the refuge, poor germination and inappropriate choice of species or genotypes. Such a setup exposes the inherent weaknesses in the existing system of refuge as advocated by the regulators. Presence of *Bt* seeds in the 120g refuge non-*Bt* seed packet is a violation of regulatory guidelines. Weak implementation of refuge strategy in India may have been one of the main reasons for the pink bollworm to have rapidly developed resistance to Bollgard-II within just 6-8 years of cultivation in the country. If such violations continue unchecked the efficacy of the alternate form of refuge namely, refuge in bag which is under consideration would also be seriously undermined.

**Key words:** Refuge, *Bt*-cotton, Cry toxins, ELISA, bollworm management.