

# COTTON Innovate



Weekly Newsletter from Central Institute for Cotton Research, Nagpur

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Issue : 2 Volume 2, February 8-14, 2015

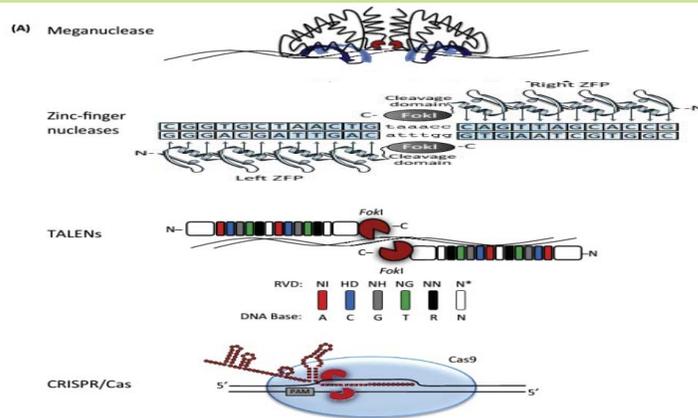
## Scientific Talk



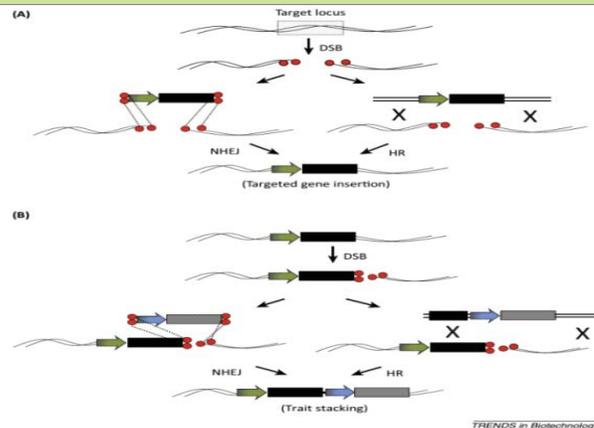
Shri Rakesh Kumar, Scientist, Agricultural Biotechnology gave a talk on “Plant Genome Engineering and Potential for Cotton Improvement” under the aegis of innovation cell on Feb.13, 2015. History of agriculture is about 10,000 years old and within this period, crops plant have been developed to meet the demands of over seven billion people on

this earth. To date, domestication and subsequent crop breeding processes focused on securing specific traits that occurred at random, either spontaneously in nature or as a result of radiation treatment or exposure to mutagenic chemicals. Traits such as high yield, high nutrition value, high fiber, etc., are frequently selected but mutations that compromised the hereditary basis of crop survival during biotic (diseases and pests, herbivores etc.) and abiotic stresses (drought and salinity, flooding, nutrient deficiencies etc. are rarely selected. As a result many of these rarely selected survival traits may have been weakened or completely lost. Back to wild breeding or re-wilding implies crossing to bring back the valuable lost traits. In reference to cotton crop, with the availability of a huge diverse collection of cotton germplasm and prevailing low cost of next generation sequencing platform has made this concept potential for cotton improvement. The method will typically identify the unintentional mutation (s) in gene (s) and next step would be re-establishing wild type properties while at the same time preserving the important traits such as high fiber length & strength, and yield . In this way the plants developed, would not only be superior in agronomic traits but also in better utilization of natural resources and resistance to biotic and abiotic stresses.

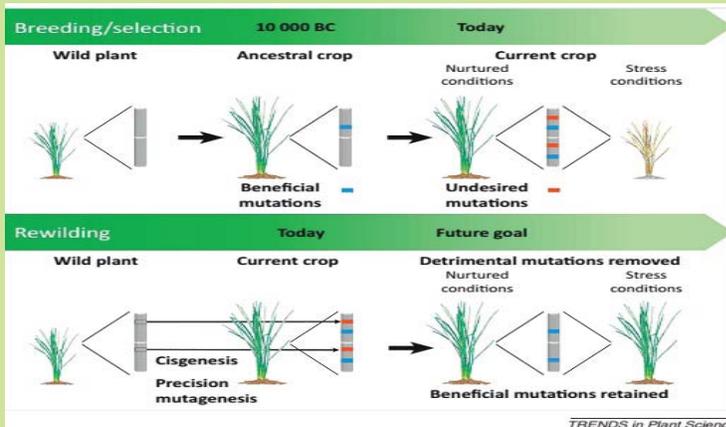
Plant genome engineering, a revolutionary technique in the field of synthetic biology, aims to create novel biological systems including customized plants and plant cells. It offers a user defined control over the genetic code- from the in silico design and in vitro synthesis to in vivo manipulation of host genetic material. Recent advances during past 5 years in sequence specific nucleases technology such as Meganucleases, Zinc Finger Nucleases (ZFNs), Transcriptions factor like affecter nucleases (TALLENS) and Clustered Regularly Interspersed Palindromic Repeats/cas (CRISPER/CasSystem) have made it possible to precisely manipulate plant genomes. In conclusion, Shri Rakesh Kumar propounded that re-wilding through precise mutagenesis is a potential tool to bring back lost abilities without compromising for useful traits in shortest possible time period, without involving transfer of genes between unrelated organisms.



Source: Trends in Biotechnology Feb 2015, vol 33, No. 2



Source: Trends in biotechnology, Feb 2015, vol 33, No. 2



Source: Trends in plant Science, 2014

## Meetings Attended

Dr. K. R. Kranthi, Director, CICR and Dr. S.Kranthi, Head Crop Protection Division attended a meeting convened by Textile Commissioner, Cotton Advisory Board, at Dharwad regarding Coloured Cotton on 9th Feb 2015.

## Exploration

ICAR-Central Institute for Cotton Research (CICR), Nagpur has carried out exploration and collection of native cultivars desi cotton and perennials/tree cotton from Nandurbar, Dhule districts of Maharashtra and Indore, Khandawa districts of Madhya Pradesh. Dr. M.Saravanan Scientist (Plant Breeding) and Mr. G.R. Kene, Technical Officer T5 participated in the expedition survey during February 9-13, 2015. During this exploration, a total of four perennials of cotton, three belonging to *G. barbadense* and one belonging to *G. arboreum* were collected. Based on characterization and evaluation, the unique ones will be identified and established in the perennial species garden.



Produced and Published by : Dr. K. R. Kranthi, Director, CICR, Nagpur  
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Production Support : Mr. Sanjay Kushwaha

Citation : Cotton Innovate, Issue -2, Volume - 2, 2015, Central Institute for Cotton Research, Nagpur



Publication Note: This Newsletter presented online at <http://www.cicr.org.in/NewsLetter.html>  
Cotton Innovate is the Open Access CICR Newsletter

The Cotton Innovate – CICR Newsletter is published weekly by  
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