

# COTTON *Innovate*



Weekly Newsletter from Central Institute for Cotton Research, Nagpur

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Issue : 2 Volume 1, January 11-17, 2015

## Literature Scan

### 'Back-to-nature' breeding: reliving the wild past

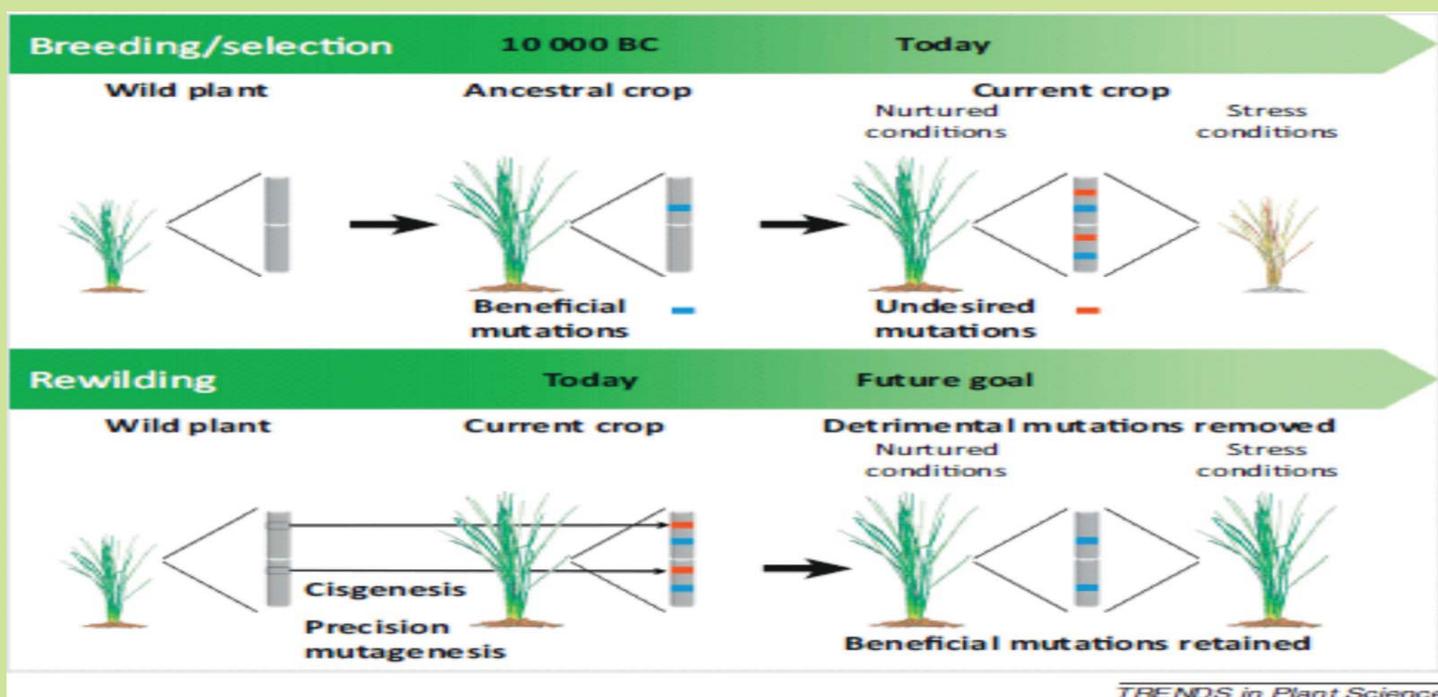
Since the dawn of agriculture as early as 10000 BC, human beings knowingly or unknowingly, have left no stones unturned to amend and manipulate the very genetic makeup of agriculturally important crops to meet the sustainability and demand for food security. The incessant process of crop improvement through man intervened desirable selections, thus bears the probability of knowingly or unknowingly overlooking certain crucial traits or mutations which otherwise would have expressed during stress conditions for instance viz. drought, salinity, nutrient deficiency, heavy metal etc. The concept of 'Back-to-nature' breeding is all about re-establishing the valuable but lost alleles or traits in the contemporary crops which once existed amidst their own ancestors or wild types to tackle environment adversities. In contrast to transgenesis which introduces genes that had never existed in the crop and its pedigree, this fresh notion relies upon "recreating" rather than "creating" novelty. This can be achieved by several well known existing crop improvement techniques viz. introgression breeding, cis-genesis, precision mutagenesis or genome editing. Introgression breeding is a conventional breeding tool which has long been in practice for introducing alleles from wild germplasm. Cisgenic approach can be adopted which involves introduction of desired gene from the same crop or compatible relatives. Precision mutagenesis deals with the techniques in relation to target specific genome editing and inducing site specific mutations in crops, which can be achieved using tools like zinc-finger nucleases (ZFNs), transcription activator-like effector nucleases (TALENs), and, most recently, RNA-guided engineered nucleases (RGENs) derived from the bacterial clustered regularly interspaced short palindromic repeat (CRISPR)–CRISPR-associated (Cas) system. Thus, back-to-nature breeding revolves around the idea of either replacing the full-length 'modern' genes with 'ancient' ones or by reverting back the discrete mutations that occurred in primitive form of contemporary genes during the extensive course of domestication.

#### Reference:

Palmgren et. al. (2014) Are we ready for back-to-nature crop breeding? Trends in Plant Science, pp. 1–10.

Doebley, J.F. et al. (2006) The molecular genetics of crop domestication. Cell 127: 1309–1321

Contributed by Dr. Joy Das, Scientist, Biotechnology Section, CICR, Nagpur.



TRENDS in Plant Science

## National Road Safety Week (11-17 January, 2015)

In India the number of vehicles on road is increasing exponentially with poor road discipline amongst the vehicle users as well as pedestrians thus leading to increase in number of road accidents. To create awareness amongst employees working at Central Institute for Cotton Research, Nagpur and Regional Station, Sirsa regarding road safety, necessary advice was passed on to the employees during the National Road Safety Week 11-17 January, 2015 .

### भा. कृ.अनु.प.- केन्द्रीय कपास अनुसंधान संस्थान क्षेत्रीय स्टेशन, सिरसा



#### राष्ट्रीय सड़क सुरक्षा सप्ताह



11 से 17 जनवरी, 2015

1. सड़क पर चलते समय साइन बोर्ड का पालन करें ।
2. सड़क पार करते समय दोनों ओर वाहन देखकर पार करना ।
3. लाल बत्ती पर पूर्णता हरी होने पर सड़क पार करना ।
4. बसों में पीछे से गेट से चढ़ना और आगे के गेट से उतरना ।
5. रोड़ पर हर समय सतर्क रहना ।
6. ट्रैफिक के सभी नियमों का पालन करना ।
7. सड़क पर तेज रफतार वाहन न चलायें । दुपहिया वाहन चालक तथा पीछे बैठने वाला व्यक्ति सदैव हेलमेट पहने और सही दिशा से ओवरटेक करें ।
8. गाड़ी चलाते समय सीट बेल्ट का प्रयोग अवश्य करें । यह गाड़ी में बैठे सदस्यों के लिए भी अनिवार्य है ।

Produced and Published by : Dr. K. R. Kranthi, Director, CICR, Nagpur

Chief Editor : Dr. Nandini Gokte-Narkhedkar

Editors : Dr. J. Annie Sheeba, Dr. Vishlesh Nagrare, Dr. J. Amudha, Dr. M. Saravanan

Media Support & Layout design : Mr. M. Sabesh

Production Support : Mr. Sanjay Kushwaha

Citation : Cotton Innovate, Issue -2, Volume - 1, 2014, 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

Central Institute for Cotton Research

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