

COTTON Innovate



Weekly Newsletter from Central Institute for Cotton Research, Nagpur

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RESEARCH ROUND-UP

TREE COTTON AND COTTON PERENNIALS OF INDIA -A SHORT NOTE

Dr. M. Saravanan Scientist Plant Breeding

Desi cotton species have originated in India particularly the three geographical races of *Gossypium arboreum* L. namely *bengalense*, *cernuum* and *indicum* and of *G. herbaceum* L. race *wightianum*. Excavations of Mohenjodaro and Harappa have shown that cloth of finest quality of about 300 counts was produced from the desi cotton species (*G. arboreum*). The cotton plant is a warm-weather shrub (or) tree that grows naturally as a perennial but for commercial purposes has been domesticated to grow as an annual crop. This perennial cotton possesses variability in useful traits like fibre, pest resistance and abiotic stress tolerance. Traditionally in all parts of India tree cotton were grown and maintained in temple grooves which are fast disappearing. So, it is necessary to collect, conserve and utilize perennial cotton germplasm resources for the posterity. Central Institute for Cotton Research

(CICR) has taken initiative to collect and conserve the landraces of desi cotton and perennials with desirable characters. Exploration trips were carried out to Maharashtra, Madhya Pradesh, West Bengal, Andhra Pradesh, Mizoram, Meghalaya, Tripura, Gujarat and Tamil Nadu for collection of cotton germplasm materials. The important cotton landraces like Ponduru, Karuganni, Commilla, Uppam and Wagad were collected from different states of India. Research is underway to exploit these resources by appropriate breeding procedure as a donor to improve economically important traits.



Three year old perennial tree cotton
(*Gossypium arboreum*) at the farmer's residence



Leaves of perennial *G. arboreum*



Flowers of perennial *G. arboreum*



SCIENTIFIC TALKS

Cloning executor R gene from cotton & characterization of pathogenicity determinant in *Xylella fastidiosa*

Dr. P. K. Chakrabarty,
Head, Crop Improvement

Dr. P. K. Chakrabarty, Head, Crop Improvement delivered talk under the aegis of 'Innovative Cell' on 'Cloning executor R gene from cotton & characterization of pathogenicity determinant in *Xylella fastidiosa*' on Sept. 21, 2013. In his talk he summarized research carried by him at the University of Florida, Gainesville, USA, as visiting scientist on sabbatical leave from March 2011-March 2012. A brief summary of his work is described below:

Some plant pathogenic bacteria, including major pathogens of the genus *Xanthomonas* (attacking cotton, citrus, rice and soybean) and *Ralstonia* (attacking many Solanaceous plants) inject transcription activator pathogenicity effector (TALE) proteins into plant cells that bind to and activate host promoters of a variety of genes, many of which promote plant disease and a few of which strongly activate plant defense. The latter are recognized as "executor" resistance (*R*) genes. The promoters from these executor *R* genes are known to be active in plants species other than the species of origin. In addition, promoter regions of such genes may be modified to recognize a variety of different TALEs from a variety of different pathogenic bacteria. TALE proteins bind to corresponding UPT (up-regulated by TALE) promoter boxes (DNA) in reactive promoters, including those of executor *R* genes, via tandemly arranged 34 amino acid direct repeats. Recent studies have revealed the TALE DNA binding code in which two specific amino acid residues called repeat variable di-residue (RVD) of each repeat define specific base-pair binding in host UPT boxes. This code can theoretically be used to design PCR primers that specifically anneal to UPT boxes on Executor *R* genes. Dr. Chakrabarty's work pertained to standardization of an effective strategy to pull out fragments of Executor *R* genes from NILs using primers complementary to *Xanthomonas* TALE-RVD guided target sequences in the former.

In another study on functional genomics of *Xylella fastidiosa* (Xf), Pierce's disease pathogen of grape, hemagglutinin was found to play definitive role in pathogenicity of this fastidious bacterium. Hemagglutinin gene (PD0986) appeared to be a strong virulence factor, since it contributed significantly to pathogenicity of Xf. Compared to role of lipase gene (PD1703) and the zonula occludens toxin (PD0928), hemagglutinin gene PD0986 conferred the strongest effect to virulence.

Dr. P.K.Chakrabarty has been selected as Assistant Director General (Plant Protection), ICAR, New Delhi and all the scientist and Director CICR, Nagpur congratulated him on his selection.



MEETING TO FINALIZE LIVE CROP DEMONSTRATIONS FOR KRISHI VASANT

A meeting was organized under the chairmanship of Dr. K. R. Kranthi, Director, CICR on 19.09.2013 to discuss the crop varieties to be showcased in the live crop demonstration plots during the forthcoming KRISHI VASANT from 15-19th Jan. 2013. The meeting was attended by senior officials from ICAR (HQ), ICAR Institutes, Department of Agriculture, Department of Sericulture, SAUs, Government of Maharashtra, NHRDF, NAFSU and the Private Seed Industry. Dr. R. G. Dani, Vice-Chancellor, Dr. PDKV, Akola, Dr. Ramehwar Singh, Project Director (DKHA), ICAR, Dr. Jai Gopal, Director, DOGR, Pune, Dr. S. K. Srivastav, Director, DSR ,

Indore, Shri V. M. Ghawate. Jt. Director Agriculture, Nagpur and other senior officials.

Dr. P. K. Chakrabarty, Head, Crop Improvement Division welcomed the delegates. Dr. K. R. Kranthi, Director, CICR in his opening remarks explained about the genesis of the Krishi Vasant, the arrangements being planned at CICR including the live demonstrations on rabi crops. A list of 240 varieties of the potential rabi cereals, oilseeds, pulses, fodder crops, fibre crops, vegetables and mulberry which can be demonstrated was finalized in the meeting. The layout of the demonstrations, facilities that can be extended by CICR, internal security arrangements and other details were discussed. The meeting ended with a vote of thanks proposed by Dr. Sandhya Kranthi, Head, Crop Protection Division, CICR, Head, Crop Protection Division.



Selection of site for Live Crop Demonstration Plots

KRISHI VASANT – National Fair cum Exhibition will be organized by the Ministry of Agriculture, Government of India, Indian Council of Agricultural Research (ICAR) and the Government of Maharashtra from 15th to 19th Jan. 2014 at Central Institute for Cotton Research (CICR), Nagpur.

HINDI FORTNIGHT CELEBRATION

Inaugural function of Hindi Fortnight Celebration was held at CICR, Nagpur on Sept. 20, 2013. Dr. V.J. Shivankar, Former Director, NRCC, Nagpur was the Chief guest. After the inaugural function two competitions i.e. Slogan writing and Translation from English to Hindi were organized in which large number of Scientific, Technical, Administrative staff along with research fellows participated.



Dr. K.R. Kranthi, Director, CICR, Nagpur felicitating Dr. Shivankar



Dr. Shivankar, Former Director, NRCC, Addressing the gathering

DISTINGUISHED VISITORS

Dr. Dath K. Mita, Crop Analyst International Production Assessment Division, Global Analysis USDA USA along with Dr. Santosh Kumar Singh Sr. Agr. Specialist, American Embassy New Delhi visited CICR, Nagpur on Sept. 18, 2013 to discuss Cotton Crop Production, Planting area and general assessment of crop.

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