COTTON INNOVATE

Cotton Innovate

A Monthly Newsletter from ICAR-Central Institute for Cotton Research, Nagpur

Cotton Flower
Photo: Dr. M. Sabesh

Cotton Innovate | Volume - 1 (1), 2021
www.cicr.org.in

Dr. Y.G. Prasad joins as Director, ICAR-CICR, Nagpur

I am glad to note that 'Cotton Innovate' is back with the January 2021 issue bringing to you the latest innovations in cotton research and outlook for scaling up. High density planting system (HDPS) is presented as the best bet strategy for productivity enhancement in resource-constrained rainfed cotton growing environments. Attention is drawn to the fact that underlying mechanisms hold key for improving fibre quality traits. Genomics is the gateway for molecular breeding programs especially for utilizing wild species of cotton – the case of decoding the first non-progenitor genome of G. australe is presented. Farmers' corner brings to you a grower's zeal in highlighting the effectiveness of canopy management in boosting cotton productivity. CICR family joins me in extending hearty congratulations to eminent cotton scientist & friend Dr Keshav Raj Kranthi on his well-deserved elevation as Chief Scientist by ICAC. A brief round-up on happenings at CICR is brought to you along with glimpses of the current cotton scenario.

Happy reading…

Y G Prasad

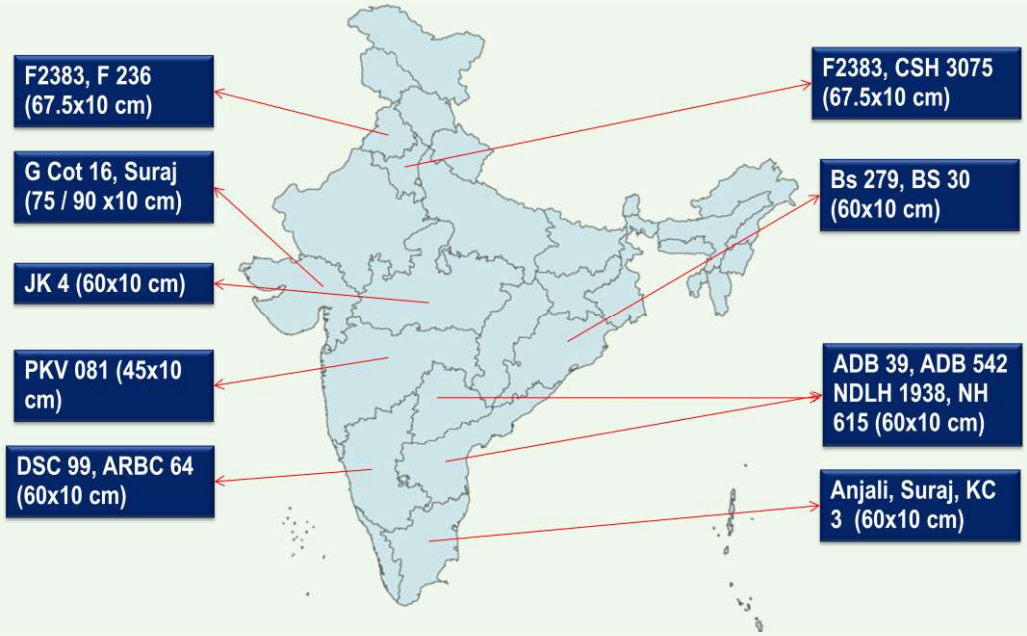
Image of the month

Invited Research Notes

HDPS in cotton – where we are and what next

Dr. M. V. Venugopalan, Principal Scientist (Agronomy) ICAR-CICR, Nagpur

High Density Planting System (HDPS), a cotton production system where semi-compact genotypes are planted at 60, 75, 90 or 120 cm between rows and 10-15 cm between plants within a row depending soil types, plant architecture and moisture availability and raised with a dovetailed agronomy. ICAR-CICR conceptualized this system in 2009-10 and in coordination with the AICRP on Cotton network evaluated more than 60 genotypes and identified the most appropriate genotypes and spacing for different locations (Fig. 1). Agronomic requirement for HDPS were also standardized for different locations under the Technology Mission on Cotton.



The most appropriate genotypes and spacing for HDPS for different locations

More than 5000 demonstrations were undertaken between 2012 and 2016 with financial aid from NFSM with the support of SAUs, State governments, KVKs in 30 districts of 11 cotton growing states – Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Odisha, Karnataka, Andhra Pradesh and Tamil Nadu under varying soil and climatic regimes. The technology received mixed success but showed consistent (more than 20%) higher yields on shallow to medium deep soils and under low moisture conditions.

Another clear pointer was that canopy management and retention of early formed bolls were pre-requisites for success of this system. The trials were conducted with non-Bt genotypes and it was felt that the adoption of HDPS would be faster with Bt varieties.

Another spin-off of HDPS technology was a change in the agenda of cotton breeders of both public and private sector to focus on early maturing, compact plant types.

Seed companies like Rasi, Ankur, Nuziveedu, Bayer (in collaboration with CITI-CDRA) and a few other also demonstrated this technology with Bt hybrids with a fair degree of success.

What next

i. Subsequently, ICAR-CICR has standardized crop architecture management technique using mepiquat chloride applied in two equal splits @ 25 g ai/ha or in 3 splits @ 17 g ai/ha.

ii. Seven Bt varieties developed by ICAR-CICR were released and notified *vide* Gazette of India SO3482 (E) dated October 07, 2020.

iii. HDPS technology was standardized by ICAR-CICR for long linted *G. arboreum* varieties PA 812, PA 810 and PA 740 released by VNMKV, Parbhani.

iv. Private seed industry has also recently developed short, compact hybrids suitable for HDPS.

There are about 38 lakh ha in 20 districts across states of Maharashtra, Telangana and Madhya Pradesh where the productivity is less than 300 kg lint/ha. Cotton is predominantly cultivated under rainfed conditions in these districts. Shallow to medium deep soils is predominant here. ICAR-CICR in collaboration with SAUs, KVKs, CSOs and Private Industry is set to demonstrate and up-scale the HDPS technology with Bt varieties/hybrids and long linted *G. arboreum* each tailored with location specific canopy and crop management technology. This would help in breaking yield barriers.

Popular Article

Fuzzless mutants for uncovering molecular mechanism of fibre initiation and development

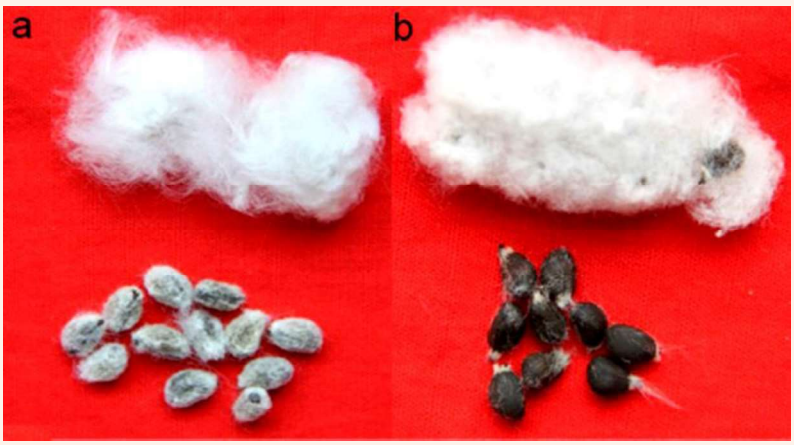
Chandrashekar, N., Saravanan, M. and Waghmare, V. N. ICAR-CICR, Nagpur

Cotton is the main fibre crop grown across the globe for its fibre and seed oil. It plays a major role in the life of Indian farmers and Indian economy. Cotton fibre constitutes both lint and fuzz. The initiation of lint development takes place on or before 0 days post anthesis (DPA) whereas fuzz development takes place during 3-5 DPA. Cotton surface with lint can be easily removed because of its long nature whereas removal of fuzz from the seed surface is difficult due to its adherence nature during cotton ginning. Generally, fuzz acts as a carrier of many pathogens leads to build up of diseases. It has also been reported that seed germination was affected much by the fuzz as compared to lint due to hampered imbibition and finally results into negative impact on cotton production. Therefore, fuzz less germplasm/mutants are essential in cotton breeding programmes. Availability or generation of fuzz less mutants not only useful for the breeding programmes but also to uncover molecular mechanism/s underlying this trait. For instance, DPL972 was one such fuzz less mutant of *G. arboreum*, generated and maintained at Institute of Cotton Research, Anyang, Henan China.

The team of scientists from this institute in collaboration with Plant Genetics, Gembloux Agro Bio Tech, University of Liège, Gembloux, Belgium, have performed fine mapping and identification of the fuzz less gene *GaFzl* in DPL972 (*Gossypium arboreum*). DPL972 mutant is a near-isogenic line (NIL) of the wild-type DPL971 with the genetic background exception to fuzz and flower colour. In this study; F1 population obtained from the cross between DPL971 and DPL972 were similar to that of DPL972; indicating dominant inheritance of fuzz less trait in *G. arboreum*. They had derived F_2 and BC_1 populations between wild type DPL971 and the fuzz less mutant DPL972. The phenotypic ratios observed in F_2 and BC_1 segregating generations were of 3:1 and 1:1, respectively. Therefore, it was confirmed that the single dominant gene was responsible for the fuzzless phenotype in DPL972. They followed bulked-segregant analysis sequencing (BSA-Seq) to rapidly map GaFzl gene to 76,294 to 2,305,623 bp region on chromosome A08.

They had developed 652 SSR markers on A08, 13 were found polymorphic for fuzzless trait and also the location of these SSR markers was overlapped with the region obtained by BSA-Seq. Further utilizing re-sequencing data of DPL971, DPL972 and the bulked pools, they developed 11 InDels and 98 SSRs to narrow down the physical map of GaFzl to a 70-kb region between SSR82 and InDel9 on chromosome A08. Upon cotton genome annotation seven ORFs were found in 70-kb region. Even though 383 genes were differentially expressed between DPL971 and DPL972; ORF1 and ORF2 were up-regulated in DPL972 at 1 DPA but other five ORFs shown non-significant differences in terms of their expression between mutant and wild types. Therefore, they had to finalize ORF1 and ORF2 as candidate genes for fuzzless trait. ORF2 (Cotton_A_11942) annotated as CAF1(component of CCR4) in cotton and on the other hand ORF1 (Cotton_A_11941) annotated as GIR1 gene (AT5G06270) known to interact with GLABRA2 (GL2) repressor and which was the regulator of root hair development in Arabidopsis.

Further to uncover the process of molecular mechanism of fibre initiation and development, they had analysed the re-sequencing and amplification data of Cotton_A_11941 and Cotton_A_11942 in DPL971 and DPL972. They found that there were no changes noticed between the two parents in their genomic or promoter sequences of Cotton_A_11942. However, they had detected TTG insertion to incorporate leucine or otherwise it could have been the shift or nonsense mutation in Cotton_A_11941. Further the analysis of BSA and re-sequencing data between two parents and bulked pools showed that single G to A and C to A mutations in the promoter region of Cotton_A_11941. Therefore, they summarised that the mutations in the promoter region could lead to differences in expression levels of Cotton_A_11941 and they were inferred that Cotton_A_11941 is the most likely gene corresponds to GaFzl.



Phenotypes of fuzzy seeds of DPL971 wild type **(a)** and fuzz-less of DPL972 mutant **(b)**

Suggested references for reading:

1. Feng, X., Zou, C., Lu, C., Cheng, H and Zhang, Y (2016). Simple sequence repeat markers closely linked with a new fuzzless gene in fuzzless mutant DPL972 (*Gossypium arboreum*). *Cotton Sci.* 28(4):392–398.

2. Feng, X., Cheng, H., Zuo, D. *et al* (2019). Fine mapping and identification of the fuzzless gene *GaFzl* in DPL972 (*Gossypium arboreum*). *Theor Appl. Genet.* 132: 2169. https://doi.org/10.1007/s00122-019-03330-3.

Popular Article

Genome sequence of cotton wild species Gossypium australe decoded

Santosh, H. B., Raghavendra, K.P. and Vinita Gotmare, ICAR-CICR, Nagpur

Cotton (*Gossypium* spp.) grown for its fibre, feed, oil and fuel wood is an immensely important crop for the sustainable economy of India and livelihood of the Indian farming community. The genus Gossypium includes 46 diploid (2n=2×=26) and 6 tetraploid (2n=4×=52) species. The whole genome sequencing is an important and fundamental step for incisive scientific studies of wide dimensions. The whole genome sequencing data provide valuable insights vital for linkage relationship studies, identification of candidate genes/promoters, development of DNA based markers and microarrays which can be used in crop improvement either through plant breeding approaches for diversity analysis, genetic fingerprinting, gene tagging, trait mapping, allele mining and marker assisted selection or through transgenics approach for gene targeting/silencing/knocking. Taking advantage of recent and rapid advances in scientific and technological processes, the genome sequence of *G. raimondii* (Wang et al., 2012; Paterson et al., 2012), *G. arboreum* (Li et al., 2014), *G. hirsutum* (Li et al., 2015; Zhang et al., 2015) and *G. barbadense* (Liu et al., 2015; Yuan et al., 2015) have been deciphered (below table).

G australe; Diploid Species; Genome – G; Distribution - Australia

Exploration of 'crop wild relatives' is a promising approach to enhance the genetic diversity for agricultural sustainability and food security. *Gossypium australe* is 'G' genome, diploid wild cotton species which possesses excellent traits for cotton improvement including resistance to disease and delayed gland morphogenesis of gossypol glands. This species has been successfully explored for distant breeding programmes to incorporate disease resistance traits. Cai and co-workers from China have successfully sequenced the *G. australe* genome by integrating four technologies viz., Pacbio single-molecule real-time (SMRT) sequencing, paired-end sequencing, optical mapping (DLS) and Illumina short-read Hi-C. They acquired 1.75 Gb final assembly sequence with a contig N50 of 1.83 Mb and a scaffold N50 of 143.60 Mb (Quality indicator of a genome assembly), with only 650 scaffolds covering the 13 haploid G. australe chromosomes (below table).

Genome sequence information of Gossypium species

Cotton species and genome	Sequencing platform	N50* Contig Scaffold (kb)	No. of predicted protein coding genes	Percent repeat sequences	NCBI Accession Code	Reference
Gossypium raimondi (D_5)	IlluminaHiSeq 2000	2284kb	40,976	57.0	PRJNA82769	Wang et al 2012
Gossypium raimondi (D_5)	Applied Biosystems 3730xl, Roche 454XLR & IlluminaGAIIx	18.8Mb	37,505	61.0	PRJNA171262	Paterson et al 2012
Gossypium arboreum (A_2)	IlluminaHiSeq 2000	665kb	41,330	68.5	SRA150181	Li et al2014
Gossypium hirsutum	IlluminaHiSeq 2000	764kb	76,913	67.2	PRJNA259930	Li et al 2015
Gossypium hirsutum	IlluminaHiSeq 2000, Sanger sequencing	1600kb	70,478	64.8	PRJNA248163	Zhang et al 2015
Gossypium barbadense	Roche 454GS FLX, IlluminaHiSeq 2000, Applied Biosystems 3730, PacBioSMRT	503Kb	77,526	63.2	PRJNA251673	Liu et al 2015
Gossypium barbadense	Illumina Genome Analyser II	260kb	80,876	69.1	PRJNA21956	Yuan et al 2015
Gossypium australe	PacBioSMRT, Illumina short read, BioNano (DLS) and Hi-C	143Mb	40,694	73.5	PRJNA513946	Cai Y et al 2019

They found that 73.5% of the *G. australe* genome is composed of various repeat sequences and showed closer collinear relationships with the genome of *G. arboreum* than *G. raimondii. G. australe* is the first non-progenitor wild species of cotton to be sequenced and marks genomic exploration of wild species for cotton improvement.

Suggested readings:

- Wang, K. *et al.* 2012. The draft genome of a diploid cotton *Gossypium raimondii. Nat. Genet.,* **44**, 1098–1103.
- Paterson, A.H. *et al.* 2012. Repeated polyploidization of *Gossypium* genomes and the evolution of spinnable cotton fibres. *Nature,* **492**, 423–427.
- Li, F.G. *et al.* 2015.Genome sequence of the cultivated cotton *Gossypium arboreum*. *Nat. Genet.,* **46**, 567–572.
- Li, F.G.et al 2015. Genome sequence of cultivated Upland cotton (*Gossypium hirsutum* TM-1) provides insights into genome evolution *Nat. Biotech.*, **33**,524–530.
- Zhang,T et al 2015. Sequencing of allotetraploid cotton (*Gossypium hirsutum* L. acc. TM-1) provides a resource for fiber improvement. *Nat. Biotech.***33**,531–537.
- Liu X, et al., 2015. *Gossypium barbadense* genome sequence provides insight into the evolution of extra-long staple fiber and specialized metabolites, *Sci. Reports,* **5**, doi: 10.1038/srep14139.
- Gotmare et al., (2009) Wild and cultivated species of cotton, CICR Technical Bulletin No: 5 available at www.cicr.org.in
- Cai Y et al., 2019. Genome sequencing of the Australian wild diploid species *Gossypium australe* highlights disease resistance and delayed gland morphogenesis, *Plant Biotechnol. J.,* doi: 10.1111/pbi.13249.

CICR Happenings

ICAR-CICR celebrates New Year 2021 at Nagpur, Coimbatore and Sirsa

Celebration of 72nd Republic day of INDIA at Nagpur, Coimbatore and Sirsa

List of important events or meetings during January 2021

Event / Meeting	Venue	Date
New Year 2021	ICAR-CICR, Nagpur, Coimbatore and Sirsa	January 1, 2021
Review Meeting of Officers & Staff of DARE & ICAR	Virtual meeting	January 1, 2021
Skill development training programme	KVK, ICAR-CICR Nagpur	January 04-13, 2021
Financial review meeting of Scheduled Cast Sub Plan (SCSP)	ICAR-CICR, Nagpur	January 5, 2021
Meeting to discuss/finalize modalities for constitution of Staff welfare club & Staff	ICAR-CICR, Nagpur	January 6, 2021
Awareness programme on ELS cultivation	ICAR-CICR Regional Station, Coimbatore	January 6, 2021
Soil health management programme by CICR, KVK	Kolar village, Nagpur	January 6, 2021
Project Monitoring and Evaluation Committee (PMEC) visit to the Colour Cotton field	ICAR-CICR, Nagpur	January 7, 2021
Visit of Project Monitoring and Evaluation Committee	ICAR-CICR Regional Station, Coimbatore	January 8-10, 2021
Review Meeting of ICAR-All India Coordinated Research Project on Cotton	ICAR- CICR, Regional Station, Coimbatore	January 9, 2021
Review meeting of ICAR-CICR by SMD	Virtual meeting	January 14, 2021
Trainings on latest cotton technologies under NFSM (CC) scheme	ICAR-CICR Regional Station, Sirsa	January 14-15, 2021
Pongal Celebration	ICAR-CICR Regional Station, Coimbatore	January 15, 2021
Meeting of Cotton Mission Project between CSIR-CMERI and ICAR-CICR	Virtual meeting	January 15, 2021
A meeting on RIB in Bt cotton	ICAR-CICR, Nagpur	January 18, 2021
Meeting on Cotton Picking Bag	ICAR-CICR, Nagpur	January 20, 2021
Meeting of 30th Agricultural Research Council of Dr. PDKV, Akola	Virtual meeting	January 20, 2021
Trainings on latest cotton technologies under NFSM (CC) scheme	ICAR-CICR Regional Station, Sirsa	January 21, 28 & 29, 2021
Meeting of the Committee to examine proposals for transfer/sale/purchase/change in name of GEAC approved Bt cotton hybrids	Virtual meeting	January 22 & 25, 2021
Interactive meeting with KVK staff	ICAR-CICR, Nagpur	January 25, 2021
Interactive meeting with technical staff	ICAR-CICR, Nagpur	January 25, 2021
Meeting with M/s. Nairuthi Seeds Pvt. Ltd., Hyderabad	ICAR-CICR, Nagpur	January 27, 2021
Monitoring of Cotton DUS trials	Virtual meeting	January 27, 2021
Dr. S.V. Sarode, Ex. Director of Research, Dr. PDKV, Akola visited ICAR-CICR, Nagpur	ICAR-CICR, Nagpur	January, 27, 2021
Training cum workshop on "Diagnosis of Boll rot disease and Pink bollworm infestation in Cotton' under NFSM-IRM: Dissemination of Pink bollworm Management Strategies	ICAR-CICR, Nagpur	January 28, 2021
Farmers training cum input distribution program under TSP	ICAR-CICR, Nagpur	January 28, 2021

Review Meeting of ICAR-All India Coordinated Research Project on Cotton

Meeting with M/s. Nairuthi Seeds Pvt. Ltd., Hyderabad


Visit of Project Monitoring and Evaluation Committee

Dr. S.V. Sarode, Ex. Director of Research, Dr. PDKV, Akola visited ICAR-CICR, Nagpur

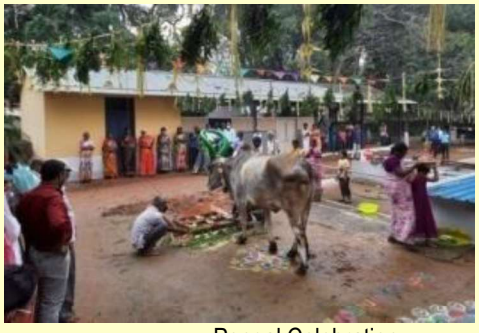
Training on "Diagnosis of Boll rot disease and Pink bollworm infestation in Cotton' under NFSM-IRM

Farmers training cum input distribution program under TSF

Soil health management programme by CICR, KVK

Trainings on latest cotton technologies under NFSM (CC) scheme

Awareness programme on ELS cultivation


Pongal Celebration

Gleanings and Events outside CICR

Dr K R Kranthi named 'Chief Scientist' after ICAC takes new path

Dr Keshav Kranthi, the globally renowned cotton scientist who has served as Head of Technical Services for the International Cotton Advisory Committee (ICAC), Washington DC, USA since 2017 has been appointed Chief Scientist, reflecting recent changes both in his work and in the direction of the ICAC. Kai Hughes, Executive Director said 'The ICAC's emphasis has changed in recent years from just providing technical information to taking a more active role in implementing the most cutting-edge science and best practices in cotton production and sustainability'. 'Implementing projects on the ground and developing international project-teams of cotton scientists are indicative of the fact that Dr Kranthi has taken on a more robust role as "Chief Scientist"'. In addition to his current responsibilities, Dr Kranthi will now be providing technical leadership for collaborative projects across the globe to shape the future research agenda for enhancement of soil health, sustainable yield improvement, efficient crop protection and development of digital tools for technology transfer.

Dr Kranthi was the former Director of ICAR-CICR, Nagpur before heading the Technical Information Section of ICAC. ICAR-CICR congratulates Dr. Kranthi for his new role and will look forward to work with ICAC in areas of relevance, importance and mutual benefits.

ICAC - COTTON WEBINARS

International Cotton Advisory Committee organized 4th Edition of WCRC-7 Monthly Plenary Lecture Series as 'Cotton Webinars' on January 6, 2021. In this edition of Cotton Webinar, Prof. Hezhong Dong discussed about 'Achieving high yields and fine quality of cotton with agronomic technologies' and Prof. Keerti S. Rathore interacted about 'Novel transgenic traits for cotton improvement'.

Prof. Hezhong Dong
Director and Senior Principal Scientist
Shandong Academy of Agricultural Sciences, China

Prof. Keerti S. Rathore
Professor, Department of Soil & Crop Sciences, Texas A & M University

Implementation Partner (IP) Meeting of Better Cotton Initiative

Better Cotton Initiative (BCI), a not-for-profit organisation aiming at sustainable cotton production, held its annual Implementation Partner (IP) Meeting in a virtual mode during 17-18 and 27-28 January 2021. Nearly 200 delegates including IPs, PU Managers, Strategic Partners, Local Partners, Knowledge partners, Experts' Organisations and BCI Capacity Building staff actively participated in the meeting. The Agenda centred on Climate change-adaptation and innovations to counter it. Dr. M. V. Venugoplan, Principal Scientist (Agronomy) and Head (PME), ICAR-CICR, Nagpur participated in the meeting.

Cotton Stakeholders Meeting

The Office of Textile Commissioner, Mumbai, Ministry of Textiles organized the first meeting of its stakeholders for cotton season 2020-21 on January 25, 2021 through video conferencing under the Chairpersonship of Smt. Roop Rashi, Textile Commissioner. The meeting discussed the current cotton situation, the modernization of cotton production in the country and the cotton trade scenario. Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. M. V. Venugopalan & Dr. D. Blaise participated in the meeting.

Scientists' Corner

Visit of ICAR-CICR scientists to seed production fields of ICAR-CICR Bt varieties in Andhra Pradesh

ICAR-CICR signed an MoU with Andhra Pradesh based seed companies like, Dhanalakmi Seed Pvt. Ltd., Sahaj Seed Pvt., Ltd., and Telanana State Seeds Development Corporation (TSSDC) Ltd. for seed multiplication and sale of ICAR-CICR Bt varieties. These firms undertook seed multiplication of ICAR-CICR Bt varieties viz., Suraj Bt, Rajat Bt, PKV 081 and GJHV 374 Bt at Nandyal district of Andhra Pradesh State. Dr. P R Vijayakumari and Dr. Sunil S. Mahajan, Principal Scientists (Seed Technology), ICAR-CICR, Nagpur visited the seed production plots of ICAR-CICR Bt varieties grown at Dornipadu and Gadwal areas of Andhra Pradesh during 06-07 January 2021. Dr. Rama Reddy, cotton breeder from Regional Station, ANGRAU, Nandyal accompanied the team for monitoring the performance of Bt varieties. The performance of Bt varieties in terms of boll bearing and bursting was highly satisfactory. The crop was at 50 percent boll bursting stage. While, the picking was yet to start at Private Seed Companies Fields and harvesting was completed by TSSDC Ltd. in Thimmapuram and Gadwal areas of Telangana. The harvested seed cotton at farmers home was noted and the experiences of farmers were recorded by the team. According to sources from TSSDC Ltd., the average yields of Bt varieties was 5-8 quintal per acre and the highest yield was noted in **case of** GJHV 374 Bt.

Dr. S. N. Rokde joins KVK, ICAR-CICR, Nagpur

Dr. S. N. Rokde, Principal Scientist (LP & M) joined KVK, ICAR-CICR, Nagpur on transfer from ICAR-IGFRI, Jhansi and took over charge of Head, KVK, ICAR-CICR, Nagpur on 25th January 2021. He was the In-charge KVK & ATIC, ICAR-CICR, Nagpur previously during 2001 to 2017. He is a scientist from ARS batch of 1986 and has vast experience in livestock production and management and has published 50 research papers, 2 books, 3 book chapters, 50 extension publications, three hundred semi technical / popular articles. He translated the book Bt cotton questions & answers and many other extension publications on cotton in Marathi language

Participation of scientists in Training/seminar/conference/symposia/etc.

- Dr. V. Santhy Principal Scientist (Seed Technology), ICAR-CICR, Nagpur delivered lecture on "Biochemical and molecular techniques for assessment of genetic purity of seeds" on 4th January 2021 in 10 days National Level Online Training Programme on "Emerging trends in seed production technology and quality control : framework for effective seed supply chain of horticulture crops", organized by College of Horticulture, Bidar.
- Dr. A. R. Reddy, Principal Scientist (Agril. Economics), ICAR-CICR Nagpur attended an online training programme on "Time Series Data Analysis" during January 04-09, 2021 organized by ICAR-NAARM, Hyderabad, Telangana.
- Dr. O. P. Tuteja, Principal Scientist (Plant Breeding) and Head, ICAR-CICR Regional Station, Sirsa delivered a lecture on hybrid seed production in a training organized by CCSHAU, Regional Station, Sirsa on 11th January 2021 at village Burj Bhangu. Total 50 farmers participated in the meeting.
- Dr. Ramkrushna G I, Senior Scientist (Agronomy), ICAR-CICR Nagpur and Dr. Amarpreet Singh, Scientist (Agronomy), ICAR-CICR Regional Station, Sirsa attended an online DST sponsored training programme on "Integrated Nutrient Management and Nutrient Budgeting through Advanced Models to Improve Crop Productivity" during 18 - 22 January, 2021 organized at ICAR-IISWC, Research Centre, Udhagamandalam, Tamil Nadu.
- Dr. V. Santhy Principal Scientist (Seed Technology), ICAR-CICR, Nagpur attended a webinar on "Research priorities for Indian seed sector", organized by Gubba seed cold storage and Federation of Seed Industry of India on 23rd January 2021.
- Dr. S. K. Verma, Principal Scientist (Plant Breeding), ICAR-CICR Regional Station, Sirsa acted as a member of the Assessment Committee for the assessment of the Technical Personnel in category-III in Group-I (Field/Farm Technicians) for grant of merit promotion/advance increment. The meeting of the Assessment Committee held on 27th January 2021 at ICAR-National Research Centre for Equines, Hisar.

- Dr. Rishi Kumar, Principal Scientist (Entomology), ICAR-CICR Regional Station, Sirsa attended a meeting of Screening Committee for selection of Assistant professor Plant Protection (PP) at Punjab Agricultural University, Ludhiana on 27th January 2021.
- Dr S K Sain, Principal Scientist (Plant Pathology), ICAR-CICR Regional Station, Sirsa acted as Jury member for P R Verma Award Competition for M Sc. & Ph.D. students during the ISMPP 41 Annual Conference and National e-Symposium on "Innovative approaches in plant health management" held during 28-30 January, 2021. A total of 12 students participated in the contest.
- Dr. Rishi Kumar, Principal Scientist (Entomology), ICAR-CICR Regional Station, Sirsa attended a meeting organized on Diagnosis of Boll rot disease and pink bollworm infestation in Cotton under IRM-PBW project along with Mr Deepak (SRF) and Mr. Rajesh (YP-I) on 28th January 2021.

Awards, Recognitions and special assignments

- Dr Babasaheb B. Fand, Scientist (Agricultural Entomology), ICAR-CICR, Nagpur, received 'Young Entomologist Award 2020' from Entomological Society of India in the award ceremony held on January 07, 2021.

Publications

- Fand BB, Nagrare VS, Bal SK, Naik VCB, Naikwadi BV, Mahule DJ, Gokte-Narkhedkar N, Waghmare VN. (2021) Degree day-based model predicts pink bollworm phenology across geographical locations of subtropics and semi-arid tropics of India. Scientific Reports, 11, 436. https://doi.org/10.1038/s41598-020-80184-6
- Giri RK, Verma SK, Yadav JP. (2021) Study of heterosis, combining ability and parental diversity for seed cotton yield and contributing traits using diallel data in cotton (G. hirsutum L.). Indian Journal of Agricultural Research, https://doi.org/10.18805/IJARe.A-5680.
- Monga D, Sain SK. (2021) Incidence and severity of cotton leaf curl virus disease on different BG II hybrids and its effect on the yield and quality of cotton crop. Journal of Environmental Biology, 42, 90-98.
- Rathinavel K, Kavitha H. Priyadharshini C. (2021) Diversity studies in extant diploid cotton genotypes with seed image and fiber characteristics. Journal of Cotton Research and Development, 35(1), 29-37.
- Rathinavel K., Priyadharshini C. and Kavitha H. (2021) Influence of seed reserves on seedling vigour, seed cotton productivity and fiber properties of upland cotton (Gossypium hirsutum). Journal of Cotton Research and Development, 35(1), 1-11.
- Sain SK, Banu G, Valarmathi P, Gawande P, Nagrale DT, Hiremani NS, Monga D, Sharma RK. (2021) Important disease and nematode problems In: Khan MR, Haque Z, Ahamad F. (Eds.) Diseases of nationally important field crops, pp 501-537.
- Sain SK, Monga D, Singh AP, Bishnoi SK, Verma P, Verma SK, Kumar R, Tuteja, OP. (2021) Determining the prominent factors contributing to the occurrence of sudden wilt in upland cotton (Gossypium hirsutum L.). Journal of Cotton Research and Development. 35(1) 107-113.
- Verma SK, Tuteja OP, Waghmare VN, Giri RK. (2021). Improvement of G. arboreum cotton for fibre quality traits vis-a-vis seed cotton yield under north Indian conditions, Journal of Cotton Research and Development, 35(1), 12-18.

Farmers' Corner

In cotton, there are two types of branches *viz.,* monopodia (vegetative) and sympodia (reproductive). The monopodia are considered less productive than the sympodia. An innovative idea proposed by a progressive farmer Shri. Dadasaheb Lad was executed by Shri. Rameshwar Ambore at his farm in Sipora Ambora village, Jafrabad taluk, Jalna district of Maharashtra. The crop was sown at 90 x 30 cm spacing on 30th May, 2020. Mr. Ambore started cutting the monopodia of the cotton plants at 30-35 days after sowing which allowed the sympodia to grow longer. Once the cotton crop attained one meter height, it was de-topped. These processes enabled the cotton plants to utilize the sunlight and nutrients more efficiently and this increased the fruiting efficiency. He adopted recommended the package of practices for nutrient and water management and undertook need based plant protection measures.

- **crop was sown at 90 x 30 cm spacing**
- **cutting the monopodia of the cotton plants at 30-35 days after sowing**
- **after one meter height of crop, de-topped**
- **each plant bear 50 bolls**
- **boll weight of 5.0 g**
- **harvested 33 quintals of seed cotton per acre**

Mr. Ambore's estimate about the yield was that each plant would bear 50 bolls with average boll weight of 5.0 g thus providing 250 g/plant. At a spacing of 90 x 30 cm there would be of 14,000 per acre. This translates to 35 quintals seed cotton per acre. Shri. Ambore informed that he harvested 33 quintals of seed cotton per acre when this technique was combined with drip irrigation with poly-mulch. After harvesting cotton, the farmer took up sowing of wheat crop on 15th November, 2020 in rabi season.

It is pertinent to note that stand alone agro-techniques *viz.,* removal of monopodia, detopping after 100 days and poly-mulch with drip irrigation developed at ICAR-CICR, and evaluated and approved by ICAR-AICRP (2014) on Cotton. The effort of the farmer to effectively integrate them into a package is indeed commendable. Shri. Rameshwar Ambore can be contacted over phone at 9860679343

Cotton plant with profuse bearing

Shri. Rameshwar Ambore

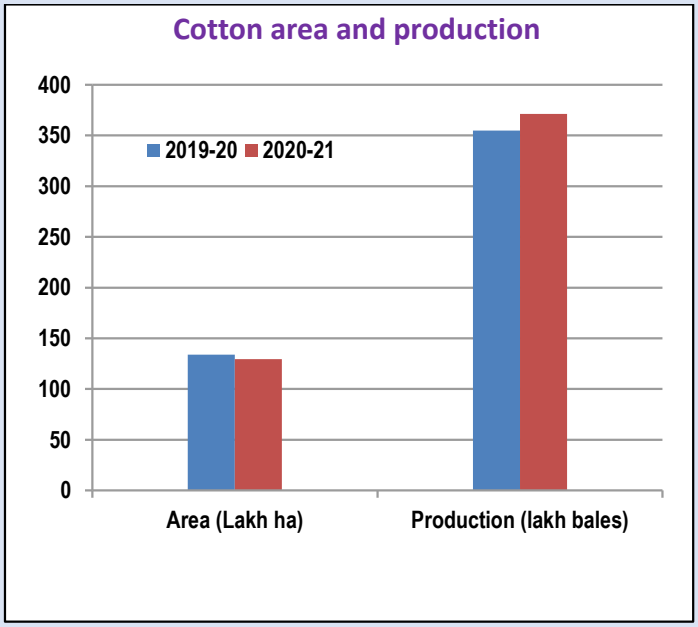
Progressive farmer, Shri. Dadasaheb Lad interacting with Dr. S. K. Chaudhari, DDG (NRM), ICAR at demonstration plot

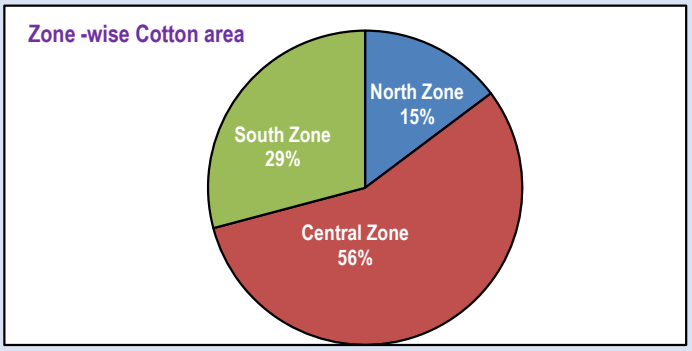
Information provided by: *Dr. Ramkrushna G.I. and Dr. Dipak T. Nagrale, ICAR-CICR, Nagpur*

Cotton Statistics and Trade

Current Cotton Scenario

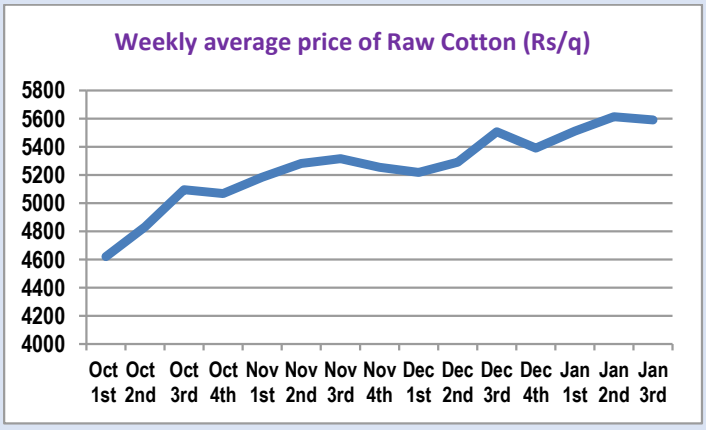
Though, Covid-19 pandemic affected the various sectors of India badly, cotton production scenario did not get affected significantly. Cotton area remained at 129.57 lakh ha due to relaxations given by the government in the movement of seeds and other inputs required at the time of sowing. Cotton production is estimated at 371.18 lakh bales higher than the previous year's production (355.01 lakh bales). Central zone comprising Maharashtra, Gujarat, Madhya Pradesh and Odisha contributes 56% of cotton area, while south zone (Telangana, Andhra Pradesh, Karnataka and Tamil Nadu) and north zone (Punjab, Haryana and Rajasthan) contributes 29% and 15%, respectively.





Market situation

The minimum support price (MSP) declared for the year 2020-21 for medium staple cotton is Rs. 5515/- per quintal while it is Rs. 5825/- per quintal for long staple cotton. The current cotton season started with a price lower than MSP. The average raw cotton price was Rs. 4620/- per quintal and gradually increased as the season progressed. By the third week of December, it reached above Rs. 5500/- per quintal. It remained at about Rs. 5600/- per quintal by the third week of January 2021. In many markets, it was above the MSP level and Cotton Corporation of India (CCI) also reduced quantum of its MSP purchases. Due to increased mill consumption and positive price situation in the world markets, further rise in the price is expected in the near future.



Global Scenario 2020-21

As per the latest U.S. Department of Agriculture (USDA) estimates, world cotton production in 2020-21 is expected to go down by about 7.5 percent and the total production is projected at 24.58 million tons. The United States accounts for more than half of this decrease. As the world economy is recovering from covid-19 pandemic and with resumption of mills to their full capacity, the global cotton mill use is expected to be increased by nearly 13 percent when compared with 2019-20. Total consumption for the year 2020-21 is projected at 25.19 million tons. As per USDA, world cotton trade is also going to rise with expected global exports at 9.49 million tons. World cotton stocks in 2020-21 are expected to decline by 3 percent to 20.97 million tons. With this expected positive scenario, moderate increase in the cotton prices are projected in 2020-21.

- *A R Reddy, Isabella Agarwal, Ropan P Bante and Saurabh Mane*

Cotton in Media

रविवार विशेष

१३

रविवार, ३ जानेवारी २०२१

सकाळ अॅग्रोवन

कापूस वेचणी यंत्राची चाचणी लवकरच

डॉ. वाय. जी. प्रसाद

नागपूर, सोमवार, १८ जानेवारी २०२१

सकाळ अॅग्रोवन

गुलाबी बोंडअळीचा प्रादुर्भाव टाळण्यासाठी फरदड घेऊ नका

कृषी विभागाचे आवाहन

अॅग्रोवन वृत्तसेवा

नागपूर : शेतकऱ्यांनी आगामी हंगामातील कापूस पिकावर गुलाबी बोंडअळीचा प्रादुर्भाव टाळण्यासाठी योग्य व्यवस्थापन करणे गरजेचे आहे. यासाठी शेतात असलेले कापसाचे पीक काढून टाकावे. तसेच शेतात असलेल्या कापसाची फरदड घेऊ नये, असे आवाहन कृषी विभागाकडून करण्यात आले आहे.

डिसेंबर-जानेवारी दरम्यान कापसाचे पीक पूर्णपणे काढून टाकावे. नंतर खोडवा (फरदड) घेऊ नये. यामुळे गुलाबी बोंड अळीची शृंखला तुटण्यास मदत होते. कापूस वेचणी झाल्यानंतर लगेचच शेतकऱ्यांनी कापूस आणि इतर पाला-पाचोळा नष्ट करून शेत स्वच्छ ठेवावे. गुलाबी बोंड अळीचा प्रादुर्भाव दिसून आलेल्या ठिकाणी कृषी विद्यापीठाच्या शिफारशीनुसार कीटकनाशकांची फवारणी करावी.

तज्ज्ञांच्या मार्गदर्शनानुसार फवारणी करा

नागपूर विभागात सोयाबीन पीक घेतल्यानंतर हरभरा पिकांखालील क्षेत्रामध्ये वाढ झाल्याचे दिसून येते. त्यामुळे हरभरा पीक उत्पादक शेतकऱ्यांनी पिकांवर घाटेअळींचा प्रादुर्भाव आढळून आल्यास सुरवातीच्या काळात पाच टक्के निंबोळी अकनि फवारणी करावी. तसेच हरभऱ्याच्या शेतात पक्षी थांबू शकतील असे थांबे उभारावेत, जेणेकरून पिकावरील घाटेअळी नष्ट करण्यास आणि पक्ष्यांना अन्न मिळण्यास मदत होईल. तसेच तज्ज्ञांच्या मार्गदर्शनानुसार फवारणी करावी, असे आवाहन कृषी विभागातर्फे करण्यात आले आहे.

सकाळ अॅग्रोवन 22.1.2021

कापूस उत्पादकतावाढीसाठी 'सीआयसीआर'चा पुढाकार

देशातील उत्पादकता (रुई किलो/हेक्टर)	
महाराष्ट्र	३११
आंध्र प्रदेश	५८०
पंजाब	५६४
हरियाना	५३३
राजस्थान	६५१
गुजरात	६१४
मध्य प्रदेश	६५७
तेलंगणा	५१२
तमिळनाडू	७१६
कर्नाटक	५५६

जागतिक उत्पादकता (रुई किलो/हेक्टर)

७५९ जागतिक

९२५ अमेरिका

१८४२ चीन

१९७९ ऑस्ट्रेलिया

१८०४ तुर्की

१५२४ मेक्सिको

५०६ भारत

दैनिक भास्कर 2.1.2021

नए साल में खेतों में लहलहाएगी रंगीन कपास की फसल

सुनील निमसरकर | नई दिल्ली

कपास या रुई का नाम सुनते ही हमारे जेहन में केवल सफेद रंग की छवि बनती है, लेकिन आपको यह जानकर आश्चर्य होगा कि प्राकृतिक कपास भी रंगीन हो सकता है। जी हां, नए साल में खेतों में रंगीन कपास की फसल भी लहलहाती नजर आएगी। नागपुर स्थित केन्द्रीय कपास अनुसंधान संस्थान (आईसीएआर) रंगीन कपास की व्यावसायिक खेती के लिए इसके बीजों की प्रजाति जारी करने से कुछ ही महीने दूर है। आईसीएआर के एक वरिष्ठ कृषि वैज्ञानिक के अनुसार रंगीन कपास की बीजों की प्रजाति के परीक्षण का अंतिम चरण आने वाले अप्रैल तक समाप्त हो जाएगा। जिसके बाद आईसीएआर की कमेटी की बैठक में इस कपास की व्यवहार्यता का मूल्यांकन किया जाएगा और इसके बाद इसकी प्रजातियों को व्यावसायिक खेती के लिए जारी किया जाएगा। उनके मुताबिक सबसे पहली इसकी खेती आंध्रप्रदेश में होगी, जिसके बाद महाराष्ट्र सहित अन्य राज्यों में फसल ली जाएगी। उन्होंने बताया कि भूरे रंग के कपास की 16301 डीबी प्रजाति को नागपुर स्थित आईसीएआर ने विकसित किया है। नाम न छापने की शर्त पर उन्होंने कहा कि देश में अब ऑर्गैनिक खेती का दौर चल पड़ा है, उसी तर्ज पर सरकार अब रंगीन कपास के उत्पादन को बढ़ावा देना चाह रही है। लिहाजा इसके प्रजाति पर अनुसंधान पर जोर दिया गया है। वे यह भी बताते है कि गुजरात से इसकी ज्यादा मांग हो रही थी। वह बताते हैं कि देश में अभी हर तरफ मौजूद कपास की आमद महज 100 साल पहले हुई है, लेकिन औद्योगिक क्रांति के कारण यह कपास ख्यात हो गया। आधुनिक कपड़ा फैक्टिरियों को लंबा और मजबूत धागे की जरूरत थी, जो रंगीन कपास से नहीं मिल पाया। साथ ही रासायनिक रंगाई ने भी रंगीन कपास को अप्रासंगिक बना दिया। वे कहते है कि रंगीन कपास की किस्मों 20वीं शताब्दी के पूर्वार्ध में जारी किया गया था। आंध्र प्रदेश के कुछ हिस्सों में व्यावसायिक खेती के लिए तीन किस्में कोकोनडा 1, कोकानाडा 2 और रेड नॉर्म्स जारी की गईं थी।

रंगीन कपास से पर्यावरण प्रदूषण को कम करने में मिलेगी मदद : रंगीन कपास के फायदे गिनाते हुए वे बताते है कि कृत्रिम रंगों से त्वचा पर एल र्जी और खुजली और कभी-कभी त्वचा कैंसर भी हो सकता है। प्राकृतिक रंगीन कपास से कपडों को कृत्रिम रंग नहीं देना पडेगा। इससे रंगाई में आने वाली लागत में कमी आएगी। दूसरा सफेद कपास से निर्मित कपड़ों की रंगाई के लिए विभिन्न कृत्रिम रंगों का उपयोग करना पड़ता है।

सकाळ अॅग्रोवन 19.1.2021

रंगीत कापसाचा प्रयोग यशस्वी

मारेगाव येथील परवेज मुजफ्फर पठाण यांनी घेतले उत्पादन

अॅग्रोवन वृत्तसेवा

यवतमाळ : शेतीचा व्यासंग जपलेल्या मारेगाव येथील परवेज मुजफ्फर पठाण यांनी प्रायोगिक तत्त्वावर रंगीत कापसाचे उत्पादन घेतले आहे. त्यांचा हा प्रयोग परिसरात चर्चेचा विषय ठरला असून, आंतरराष्ट्रीय स्तरावर नैसर्गिक रंग असलेल्या कापसाला चांगला दर असल्यामुळे बीजोत्पादनाच्या माध्यमातून लागवड क्षेत्र ५० एकरांपर्यंत विस्तारण्याचा त्यांचा मनोदय आहे.

बुरांडा (ता. मारेगाव) येथील मिर्झा सलीम बेग हे परवेज पठाण यांचे नातेवाईक. मध्य प्रदेशातील एका महाविद्यालयात प्राध्यापक असलेल्या मिर्झा बेग यांनी शेती संशोधनात स्वतःला झोकून दिले होते. निवड पद्धतीने त्यांनी राजहंस नावाचे कापसाचे वाण विकसित करून शेतकऱ्यांना लागवडीसाठी दिले. या वाणाची उत्पादकता अधिक असल्याने शेतकऱ्यांकडूनही त्याला पसंती मिळाली होती. परंतु या वाणाचा व्यावसायिक वापर आणि विस्तार मिर्झा सलीम बेग यांना करता आला नाही. त्यांच्याकडूनच रंगीत कापसाचे बियाणे परवेज मुजफ्फर पठाण यांना मिळाले.

बारा वर्षांपूर्वी पांढऱ्या कापसात खाडे (गॅप) भरण्याकामी याचा वापर परवेज पठाण करायचे. त्या वेळी रंगीत कापसाला मागणी नसल्यामुळे खाडे भरण्यापुरताचा त्याचा वापर होत होता. आता मात्र जागतिक आणि स्थानिकस्तरावर नैसर्गिक रंग असलेल्या कापसाला मागणी वाढली. त्या पार्श्वभूमीवर केंद्रीय कापूस संशोधन संस्थेने रंगीत कापूस वाणाच्या बीजोत्पादनाचा करार 'महाबीज' आणि डॉ. पंजाबराव देशमुख कृषी विद्यापीठासोबत केला आहे. या बाबतची माहिती मिळाल्यानंतर परवेज पठाण यांनी देखील आता रंगीत कापसाचे व्यावसायिक उत्पादन घेण्याचा निर्णय घेतला.

मारेगाव : रंगीत कापूस दाखविताना सलीम बेग.

मारेगाव : शेतातील रंगीत कापसाचे झाड.

थेट लागवड शक्य

सरळ वाण असल्यामुळे याची थेट लागवड शक्य आहे. सुमारे ५० एकरांत त्याची लागवड येत्या हंगामात करण्याचा त्यांचा विचार असून, त्याकरिता कुटुंबाच्या १० एकर शेतीसोबतच उर्वरित क्षेत्र करारावर केले जाणार आहे. परवेज पठाण यांचा हा प्रयोग आत्महत्याग्रस्त यवतमाळ जिल्ह्यासाठी गेमचेंजर ठरणार का, हे पाहणे औत्सुक्याचे राहणार आहे.

> केंद्रीय कापूस संशोधन संस्थेने रंगीत कापूस लागवडीला प्रोत्साहन देण्याचा निर्णय घेतला आहे. त्यामुळे या कापसाच्या उत्पादनाला चांगले भविष्य असल्याची बाब हेरत येत्या हंगामात ५० एकरांपर्यंत रंगीत कापसाच्या लागवडीचा निर्णय घेतला आहे.
>
> – सलीम शेख, शेतकरी

रविवार, २४ जानेवारी २०२१

सकाळ अॅग्रोवन

केंद्राच्या स्पष्ट धोरणाअभावी 'जीएम' संशोधन अडगळीत

संशोधनासाठी २ हजार कोटींचा निधी, मात्र वापरावर प्रतिबंध

केंद्राच्या स्पष्ट धोरणाअभावी 'जीएम' संशोधन अडगळीत

Produced and Published by
Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur

Chief Editor:
Dr. H. B. Santosh

Associate Editor, Cover page & Layout Design:
Dr. M. Sabesh

Editors:
Dr. V. Chinna Babu Naik, Dr. Pooja Verma, Dr. Joy Das,
Dr. K. Baghyalakshmi, Dr. Debashis Paul

Publication Note:
Cotton Innovate is an Open Access monthly newsletter of ICAR-CICR, Nagpur available online at http://www.cicr.org.in/cotton_innovate.html and published by

Director
ICAR-Central Institute for Cotton Research
Post Bag No. 2, Shankar Nagar PO, Nagpur 440010, India
Phone: 07103-275536; Fax: 07103-275529
Email: cicrnagpur@gmail.com, director.cicr@icar.gov.in

Correct citation:
Cotton Innovate 2021, ICAR-Central Institute for Cotton Research, Nagpur, India, Volume: 01 (01), pp- 14, available at http://www.cicr.org.in/cotton_innovate.html

To subscribe for receiving an electronic copy of this newsletter,
please write a request mail to cicrinnovate@gmail.com

ICAR-CICR
ICAR - Central Institute for Cotton Research
(An ISO 9000 : 2015 Certified Organisation)