

Cotton Innovate

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



Rosetting of cotton flower and pink bollworm infestation on cotton in isolated pockets in the North Zone

Photo: Dr. S. K. Sain

Invited Research Note

Seed production and quality control under 'refuge-in-bag' ...

by V Santhy & G Balasubramani

Page 1-2

CICR Happenings

Celebrations, Training programmes, Meetings, Visits, etc.

Page 5-11

Farmers' Corner

Farmer from Adilabad successfully managed the pest incidence through technological interventions under FLD

Page 14

Cotton Statistics

Domestic cotton scenario during July 2021

Page 15



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COTTON INNOVATE

Invited Research Note

Seed production and quality control under 'refuge-in-bag' (RIB) implementation for Bt cotton in India

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India leads the world in cotton production with a total of 6.3 million tonnes (<https://www.icac.org/>) which predominantly comes from Bt cotton occupying more than 90% of the cotton cultivated area in India. The Government of India (GoI) during approval for Bt cotton for commercial cultivation in 2002, advocated growing of non-Bt (as refuge) in 20% of Bt cotton area sown. This structured refugia strategy has met poor compliance by Indian farmers (Kranthi et al. 2017) and this poor compliance is considered as one of the major reasons for development of resistance in pink bollworm. The GoI introduced an alternate strategy of blending non-Bt seeds with Bt seeds so that there is an automatic compliance of refuge planting which can help to extend the longevity of Bt technology. Accordingly, a gazette notification [S.O. 4215(E) dated 27 December 2016] on 'refuge-in-bag' (RIB) in Bt cotton was brought out which mandates blending of 5-10% non-Bt seeds with 90-95% Bt seeds in each Bt seed packet being sold in the market from June 2020. The farmers are to be provided with a seed of 25g non-Bt refuge within 450g Bt seed in a 475g Bt cotton seed packet. This management measure (RIB) is being followed for Bt maize carrying herbicide resistance in countries like USA, Canada and Vietnam.

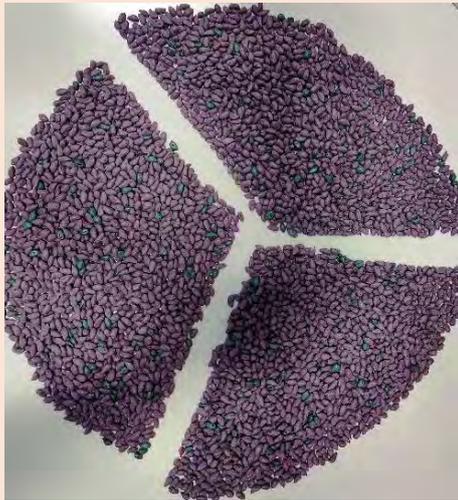


Fig. 1. Uniform distribution of green (refugia) seeds after thorough mixing of seed lot



Fig. 2. Refugia seeds (indistinguishable) in RIB seed lot

The seed producers and seed quality officials have a major role to play in effective implementation of RIB strategy. The quality of refuge seeds with regard to its physical purity, genetic purity and germination cannot be compromised under RIB (Mohan 2018; Mohan and Sadananda 2019). The seed producers have to ensure timely supply of refuge seeds (isogenic non-Bt version of the corresponding Bt hybrid /variety or any non-Bt hybrid/variety with similar flowering period and fiber traits as that of Bt hybrid/variety) in required quantity and quality for RIB strategy to be beneficial in the long run.

The stage of blending of 5-10% non-Bt with 90-95% Bt seeds and thorough mixing of seeds determines the uniformity of seed lot. Only a uniform seed lot with minimum heterogeneity can provide error-free testing of seeds (Fig. 1). Under seed law enforcement, seed inspector randomly picks a seed packet kept under sale. The producer/company hence needs to put in extra-caution so as to ensure that each Bt seed packet sold in the market carries the prescribed level of refuge seeds and there is no misrepresentation. After opening a seed packet seized from the dealer, it is suggested that seed inspector should further mix and homogenize the seed content before sending one Unlike structured refuge where non-Bt seeds are in separate pack and are coated with differentially colored polymer, under RIB, Bt and non-Bt seeds are indistinguishable and blended into a single lot (Fig. 2). third portion to a seed analyst.

This shall make the submitted sample a true representative of the original packet. Hence, authentic detection of percentage of non-Bt seeds in a bag of Bt seed packet is as important as testing for Bt seed purity. Compared to Bt, the proportion of non-Bt seeds is extremely low and hence, detecting them becomes more challenging. The process of collecting a representative test sample and determining a minimum seed sample size for authentic determination of the prescribed level of non-Bt seeds in a commercial seed lot is significant under RIB. The test result should not lead to a situation in which a seed lot meeting the required quality standard is falsely rejected or a seed lot which is inferior in standards is falsely accepted.

The Department of Agriculture and Co-operation, Ministry of Agriculture, New Delhi entrusted ICAR-CICR to devise a suitable protocol and guideline to authentically test seed samples under RIB so that it can be notified. A systematic and multi-phased study was therefore planned with a series of experiments at ICAR-CICR, Nagpur. A probable sample size to detect 5% non Bt seed in a blended seed lot was statistically obtained, which was later ascertained on estimated as well as few higher and lower sample sizes by visual method using 5% differentially colored seeds presumed as non Bt refuge. The identified sample size was validated by ELISA on control seed lot containing 95% Suraj Bt and 5% Suraj non Bt and revalidated on commercially available seed packets of Bt hybrids. As an outcome of this study, testing of minimum of 180 seeds was determined as the minimum sample size to ascertain the presence of required level of refuge in a Bt seed packet commercially sold in the market. The cost involved in the process of testing is significant and was also considered while determination of minimum sample size. The appropriate method of collecting a representative sample along with the required number of individual seeds to be tested for non-Bt (by testing for both Cry1Ac as well as Cry2Ab) was communicated to DAC during October 2020. The proposed sample size may be used for ascertaining RIB compliance in the commercially available Bt cotton seed lots. This study from ICAR-CICR is helpful to resolve one of the critical issues associated with the seed sampling for detection of level of refuge in a commercial Bt cotton seed packet thereby assisting in monitoring the RIB compliance in India.

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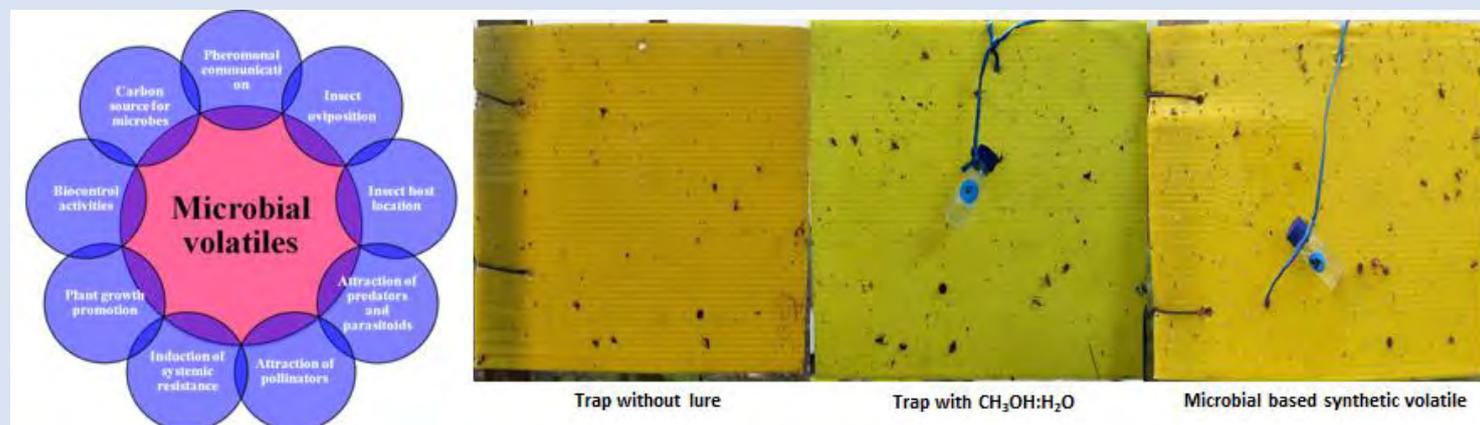
Bioprospecting microbial volatiles for plant growth promotion and pest management in cotton

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India accounts for approximately 38% of the world cotton area, but the average productivity of cotton is markedly low compared to the world average. Fluctuations in monsoon coupled with low soil fertility and insect pests are the major factors, which affect cotton production in India. About 1326 species of insects have been reported on cotton worldwide. In India, cotton suffers severe economic damage from several insect pests, including bollworms and sucking pests. To manage cotton pests, farmers largely depend on conventional groups of insecticides such as organochlorines, organophosphates, carbamates, pyrethroids, etc. However, continuous and indiscriminate use of insecticides in cotton has resulted in insect resistance to insecticides. Apart from resistance development in insects, environmental pollution in terms of the accumulation of pesticide residues in soils, adverse effects on natural enemies (predators and parasitoids) and resurgence of minor pests were also reported in cotton. It was estimated that cotton farming alone consumes at least 10% of all insecticides used globally. In this present situation, farmers are looking for alternative ecofriendly, cheap and cost-effective pest management options, including the use of pheromones, biopesticides/bioagents etc. Further, worldwide demand for organically grown fibre also entails that farmer use eco-friendly and non-chemical approaches to manage insect-pests in cotton. Hence, in this situation, there is an urgent need for an alternative, but sustainable and effective technology to manage pests in cotton apart from enhancing cotton productivity.

Microbial volatile organic compounds (mVOCs) represent a new frontier in bioprospecting. Different types of organisms produce several complex and dynamic volatile compounds, which have high enough vapor pressures under normal conditions to significantly vaporize and enter the atmosphere (Chaparro et al. 2014). The dominant class of compounds emitted by bacteria includes alcohols, alkanes, alkenes, ketones, esters, pyrazines, lactones, and sulfides. Fungi typically produce alcohols (e.g., isomers of butanol, pentanol, octanol), hydrocarbons, ketones, terpenes, alkanes, and alkenes. Chemical ecologists consider mVOCs as potential semio-chemicals that function as attractants and repellents to insects and other invertebrates. Some mVOCs attract or repel insects, inhibit the growth of microorganisms competing with associated insects, stimulate oviposition, mimic plant hormones, or even induce plant resistance (Ryu et al. 2003).



Insects exhibit strong aggregation behaviors to specific microbial communities, although few researchers have treated mVOCs directly as pheromonal communications as a signal for food sources, oviposition sites, or mating opportunities. Several insects possess aggregation pheromones that are released by them or in association with fungal and bacterial symbionts. There is an urgent need to investigate the role of mVOC emissions in insect behavioral ecology, microbially-mediated insect attraction, repellence, and aberrant behaviors (Ezenwa et al. 2016). In some cases, microbial associations are reported to be responsible for important physiological functions of insects, and insect-microbe interactions even contribute to quorum sensing. Studies conducted on volatile application under open-field conditions suggest that mVOC emissions can be explored to trigger defense against both pathogens and herbivores in crop plants apart from reducing hazardous chemical pesticide usage in agriculture.

The market demand for these naturally derived compounds (biofertilizers and biopesticides including mVOCs) has increased worldwide considerably in recent years, but their use remains low at 4% of the global pesticide market. Recent studies conducted under open field conditions demonstrate that efficient adoption of mVOCs contributes to sustainable crop protection and production in agriculture (Tasin et al. 2018). Though, several thousand volatile organic compounds (VOCs) emitted by plants have been identified so far, only several hundred compounds have been identified from microorganisms. The mVOCs emission, which was first reported by Ryu et al. (2003), is now recognized as an important aspect of plant-microorganism interactions. Microorganisms are also reported to consume VOCs as a carbon source and their degradation product impacts the volatile composition of soil. Recently, a database of bacterial and fungal volatiles has been compiled and is available online at <http://bioinformatics.charite.de/mvoc> (Lemfack et al. 2014). Bacterial and fungal mVOCs modulate plant growth and defense, interspecies interactions between plant, bacteria, fungi, and nematodes, play a role as attractants of natural enemies, as bio-control agents and find suitable applications in pest/insect/herbivore management.

The mVOCs produced by PGPRs play an expedient role by controlling plant pathogens, stimulating plant growth and inducing systemic resistance (Ryu et al. 2003). The mode of action of mVOCs has an extra degree of advantage over other biocontrol and growth-regulating mechanisms that mVOCs do not need any physical contact with pathogen or plant parts, while most of the other processes in controlling phytopathogens and promoting plant growth, require physical contact and close vicinity. VOC-mediated regulation of plant endogenous auxin homeostasis and iron uptake by roots has been documented. In addition to promoting plant growth, microbial VOCs may induce disease resistance and abiotic stress tolerance. The mVOCs influence on the modulation of phytohormones, induction of systemic acquired resistance, defense and priming response, multiple pathogen resistance, and change in plant biomass, growth, and development has been extensively studied and reviewed elsewhere. Over the years, a variety of in vitro, small-scale volatile exposure methods have been developed to study volatile-mediated interactions between bacteria, fungi and plants. Preliminary replicated field trap catches studies conducted at ICAR-CICR using microbial volatiles revealed potential benefits of microbial volatiles in trapping whiteflies, jassids, aphids, and other pests, apart from attraction of beneficial insects to cotton. In whiteflies and jassids, 29%-126% and 13%-124% increase in the trap catch was recorded, respectively, compared to control. Our results indicate that there is an urgent research need to explore the possibility of usage of microbial volatiles in cotton production as an ecofriendly alternative to synthetic chemicals to protect the environment and simultaneously enhance plant growth and productivity of cotton.

**Microbial
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trapping of
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References and suggested readings

1. Chaparro JM et al. 2014. Rhizosphere microbiome assemblage is affected by plant development. *ISME J.* 8:790-803.
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CICR Happenings

Identification of new villages and collection of baseline information in Hingna cluster under MGGM programme

A team of scientists comprising of Dr. Suman Bala Singh, Principal Scientist (Plant Breeding), Dr. Dipak Nagrale, Scientist (Plant Pathology), Dr. Santosh, H. B. Scientist (Plant Breeding) and Dr. Savitha Santosh, Scientist (Agri. Microbiology) visited Hingna cluster, Nagpur under CICR–Mera Gaon Mera Gaurav (MGGM) programme on July 07, 2021. The team had visited different villages of the Hingna cluster and interacted with the farmers. Based on the interaction, the team had identified new villages (Metaumari, Khairi, Nildoh, Kinhi, Dhanoli) for MGGM programme of ICAR-CICR. The team also interacted with the village leaders and farmers and collected the baseline information of newly identified villages of Hingna cluster. The team surveyed and monitored the cotton crop in the cluster villages. The crop was 2-3 weeks old in most of the fields. Minor incidence of dry root rot disease in some fields due to erratic rainfall followed by dry spell was observed. The sap sucking insect pests like aphids and jassids were also observed but were below Economic Threshold Levels.



Farmers training cum input distribution at Adilabad, Telangana.

One day farmers' training cum inputs distribution programme was organized at Boath mandal of Adilabad district of Telangana under TSP project by ICAR-CICR, Nagpur on July 08, 2021. The programme was coordinated by Dr. V. Chinna Babu Naik (Senior Scientist & Nodal officer TSP, ICAR-CICR, Nagpur), Dr. Chandrashekar, N (Member, TSP) and Mr. Sujit Kumbhare (Member, TSP). Fifty tribal farmers from Patnapur, Kothapalli and Nakkalweda villages of Boath mandal participated in the programme.



Dr V. Chinna Babu Naik demonstrated installation of pheromone traps in the cotton fields for the management of pink bollworm and also educated the farmers for the field identification of pink bollworm for their management. Dr. Chandrashekar N. educated the tribal farmers about pesticide applications and timings to reduce side effects on health of farmers and for effective control of pests. The kits of vegetable seeds containing five types of vegetables viz. french bean, cowpea, cluster bean, Chilli and okra along with cotton picking bags and pheromone traps were distributed to the participated tribal farmers. Mr. G. Swamy (ADA) and Mr. Vishwamitra, MAO, Both Mandal were present on the occasion along with sarpanch of villages, Smt. Bagubai Pandram and Vijay Kodapa.



Farmers' training programme in Chaaharwala and Khedi Kagdaana, Sirsa

A one-day training programme was organized by ICAR- CICR Research Regional Station, Sirsa at MGMG villa, Chaaharwala and Khedi Kagdaana, Sirsa on July 08, 2021. Scientists from the station namely, Dr. Rishi Kumar, Principal Scientist (Entomology), Dr. S.K. Sain Principal Scientist (Plant Pathology), Dr. Amarpreet Singh, Scientist (Agronomy) Sh. Debashis Paul, Scientist (Seed Science and Technology) coordinated the training programme. During the program cotton production and protection, lectures were delivered by CICR scientists and Q&A session was organized, advisories were provided to the farmers. Field visits were also organized to understand the biotic and abiotic problems and crop conditions. Around 80 farmers from the villages participated actively in the programme.





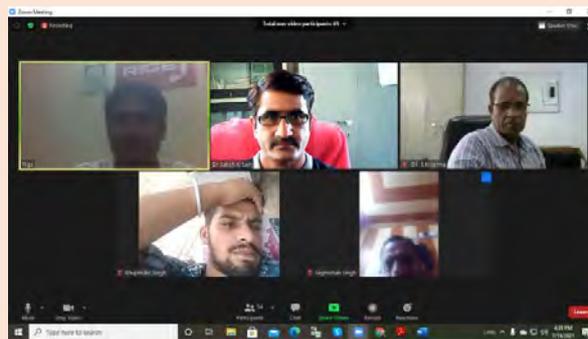
Diagnostic field visit-cum-on farm guidance to the cotton farmers

A team of scientists from ICAR-CICR, Nagpur comprising Dr. Ramkrushna G.I. (Agronomy), Dr. Shailesh P. Gawande (Plant Pathology) and Dr. Babasaheb B. Fand (Agril. Entomology) visited the villages viz., Adasa, Varoda and Sonapar (Tehsil Kalmeshwar, Dist. Nagpur) on July 13, 2021 adopted under 'Mera Gaon Mera Gaurav' (MGMG) program. The visit was accompanied by Mr. Rahul Panchabhai and Mr. Akash Sawarkar, the Coordinators of Bandhan Project being implemented in the same villages by Agrovision Foundation, Nagpur. The visit was a part of the joint venture between ICAR-CICR and Agrovision Foundation in disseminating the technical know-how of cotton production to the famers of adopted villages through collaborative efforts. The programme is sponsored by South Asia Biotechnology Centre (SABC), PI Foundation and Rasi Seeds Pvt. Ltd. The purpose of visit was to collect the baseline data on socio-economic conditions of the study villages, to build up the rapport with the cotton farmers, to provide guidance to the farmers on crop stage specific management strategies for weeds, nutrients, insect pests and diseases. Different aspects of cotton production and protection were explained to the farmers during the interactive visit.



Training programme series on 'advanced cotton production technologies for north India'

A two days web training programme series on 'advanced cotton production technologies for north India' was jointly organized by ICAR-CICR, Regional Station, Sirsa and RIGS Sustainable Solutions Pvt. Ltd. on July 15 & 19, 2021. The inaugural session was chaired by Dr. Y. G. Prasad, Director ICAR-CICR, Nagpur. He emphasized importance of production technologies for sustainable cotton production. Dr S. K. Verma, Head (I/C), ICAR-CICR, Regional Station, Sirsa delivered the lecture on the "Present cotton production scenario in North India". During the programme cotton production and protection, lectures were delivered by Dr. Rishi Kumar on important & emerging insect pests in cotton with special reference to Pink Bollworm and their management and by Dr. S.K. Sain on important & emerging diseases of cotton: Identification and their management. Dr Amarpreet Singh gave lecture on Agronomic practices for higher cotton production and Sh. Debashis Paul on "Quality Seed production techniques in Cotton". At the end of the programme, the Q&A session was organized, and advisories were provided to the farmers. During these days 200 farmers from the different villages of Bathinda, Faridkot and Muktsar districts of Punjab State participated in the programme.



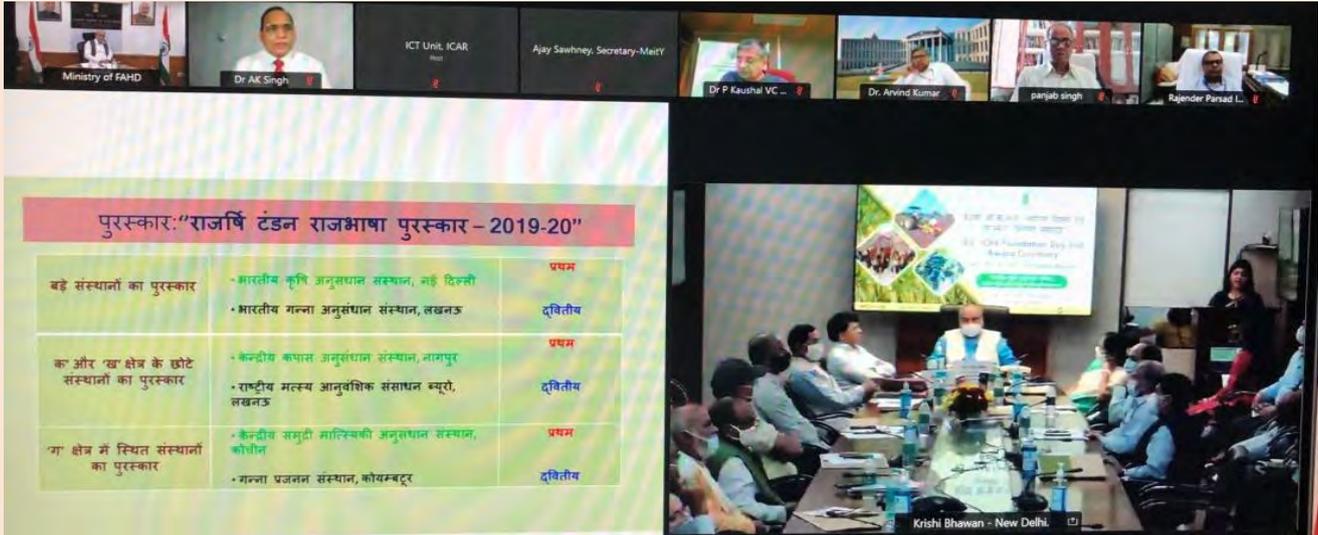
Celebration of ICAR Foundation Day and tree plantation programme

In Commemoration of 75th Year of India Independence (Azadi ka Amrut Mahotsav), on the occasion of 93rd ICAR foundation day, a tree plantation campaign was organized by ICAR-CICR on the theme "Har Med Par Ped". All scientific staff of ICAR-CICR actively participated in the programme and planted the tree samplings. On the occasion, Dr YG Prasad, Director, ICAR-CICR led the plantation drive and urged the scientists to take up tree plantation drives in various villages adopted under CICR-Mera Gaon Mera Gaurav programme.



ICAR-CICR is awarded with Rajashree Tandan Rajbhasha Award 2019-20

ICAR-CICR, Nagpur received the prestigious ICAR "Rajashree Tandon Rajbhasha Puraskar 2019-20" on 16 July 2021 during 93rd ICAR Foundation Day and Award Ceremony. Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur participated in the ICAR Foundation and Award Function 2021 and received the award virtually on behalf of ICAR-CICR, Nagpur.



पुरस्कार: "राजर्षि टंडन राजभाषा पुरस्कार - 2019-20"

बड़े संस्थानों का पुरस्कार	<ul style="list-style-type: none"> भारतीय कृषि अनुसंधान संस्थान, नई दिल्ली भारतीय गन्ना अनुसंधान संस्थान, लखनऊ 	<ul style="list-style-type: none"> प्रथम द्वितीय
क' और 'ख' क्षेत्र के छोटे संस्थानों का पुरस्कार	<ul style="list-style-type: none"> केंद्रीय कपास अनुसंधान संस्थान, नागपुर राष्ट्रीय मत्स्य आनुवंशिक संसाधन केंद्र, लखनऊ 	<ul style="list-style-type: none"> प्रथम द्वितीय
'ग' क्षेत्र में स्थित संस्थानों का पुरस्कार	<ul style="list-style-type: none"> केंद्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोचीन गन्ना प्रजनन संस्थान, कौरम्बटूर 	<ul style="list-style-type: none"> प्रथम द्वितीय

Farmers training cum input distribution under SCSP

A team of scientists from ICAR-CICR, Nagpur comprising Dr. Ramkrushna G.I. (Agronomy), Dr. Shailesh P. Gawande (Plant Pathology) and Dr. Babasaheb B. Fand (Agril. Entomology) coordinated training cum input distribution on July 16, 2021 under SCSP. Around 30 scheduled caste farmers from Welsakhra village at Village Panchayat hall attended the training session. During an interactive session with the farmers, Dr. Ramkrushna guided about the nutrient scheduling during different growth stages of cotton crop and urged the farmers to rationalize the use of chemical fertilizers and give more emphasis on application of organic manures like FYM, compost and green manuring for maintaining the soil health and productivity. Dr. Babasaheb B. Fand advised the cotton growers to avoid use of chemical insecticides during initial vegetative growth stage of cotton crop (60 days from sowing) in order to minimize the aggravation of sucking pest menace. Guidance was provided on adopting the ETL based insecticide sprayings, compliance of label claims and safety measures while handling of pesticides. Dr. Shailesh P. Gawande educated the farmers about importance of seed treatment with fungicides before sowing in management of soil borne diseases. He also suggested spot drenching of recommended fungicides wherever the problem of root rot and wilting of cotton seedlings was observed. After interaction with the farmers, fertilizer (10:26:26) was distributed to Scheduled caste beneficiaries. Sh. Ashwin Meshram and Sh Vijay Gaikwad enrolled all the beneficiary farmers and facilitated in the distribution of inputs in the village.



Interactive session cum exposure visit of Post Graduate Students of Chaudhary Devi Lal University (CDLU) to ICAR-CICR, Regional Station, Sirsa

Two days interactive session cum exposure visit for Post Graduate Students (Biotechnology) of CDLU was organized by ICAR-CICR Regional Station, Sirsa during July 22 to 23, 2021. Dr. Priyanka Siwach, Chairperson, Dept. of Biotechnology and Dr. J.S. Dhuan, Assistant Professor, CDLU, Sirsa along with 25 M.Sc. Biotechnology students have visited the station. The Session was chaired by Dr. S.K. Verma, Head (I/C), ICAR-CICR, RS, Sirsa. The students were exposed to the research, development and extension activities being undertaken by ICAR-CICR, Regional Station, Sirsa. The Scientists of ICAR-CICR, RS, Sirsa explained about the research programmes being carried out at the station. Visit to the laboratory and field experiments were also conducted.



Training programme on “Recent advances in cotton crop production & protection technologies for north India”

A web training programme on “Recent advances in cotton crop production & protection technologies for north India” was organized by ICAR-CICR Regional Station, Sirsa on July 24, 2021 with the sponsorship of Better Cotton initiative (BCI) & Ambuja Cement Foundation (Bathinda). The inaugural session was chaired by Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur. Dr. Prasad appreciated the cotton productivity level achieved by the champion farmers. He emphasized on timely management of emerging pests through adherence to cotton advisories from ICAR-CICR, SAUs, and State Department of Agriculture. Dr. S. K. Verma, Head (I/C), ICAR-CICR, RS, Sirsa delivered the lecture on the “Cotton production scenario in north India”. During the programme cotton production and protection, lectures were delivered by Dr. Rishi Kumar, Dr. S.K. Sain, Dr Amarpreet Singh and Sh. Debashis Paul. At the end of the programmes, the Q&A session was organized, and advisories were provided to the farmers. Around 127 field officials of BCI & Ambuja Cement Foundation working in the Bathinda, Mansa, Fazilka, Muktsar districts of Punjab and Hanumangarh, Sriganaganagar and Nagaur Districts of Rajasthan were participated actively in that programme.



Convergence meeting for quality cotton seed production of public sector varieties/ hybrids

A meeting with the breeders of 'ICAR-AICRP on Cotton' was held on virtual platform on July 28, 2021 to discuss about the quality cotton seed production and promotion of public sector varieties and hybrids. The meeting was chaired by the Dr YG Prasad, Director, ICAR-CICR, Nagpur and the scientists from ICAR-CICR and different AICRP centres viz., PAU (Faridkot) NAU (Surat), Dr PDKV (Akola), MPKV (Rahuri), VNMAU (Nanded), UAS (Dharward), ANGRAU (Guntur) and TNAU (Coimbatore) participated in the virtual meeting. It was emphasized that each center can concentrate on two or three varieties /hybrids for promotion and upscaling. Non-Bt hirsutum varieties may be promoted in organic cultivation, whereas high yielding long linted desi varieties / hybrids to be promoted in both North zone (irrigated) and Central zone (rainfed). For high density planting systems, recently released Bt cotton varieties from ICAR-CICR are to be promoted in the respective cotton growing zone. Centre-wise, the cotton varieties / hybrids were shortlisted for quality seed production and promotion. Heads of Divisions and Regional Stations along with Dr. Suman Bala Singh, Dr. Vinita Gotmare, Dr. A. R. Reddy, Dr. K. Rathinavel, Dr. S. Manickam, Dr. S. Usharani, Dr. H B Santosh, Dr. A. Manivannan, Dr. Baghyalakshmi were present in the meeting.

Agricultural graduates visited CICR Regional Station, Coimbatore

Two batches of B.Sc., (Hons.) Agriculture III year students from the Gandhi Gramam Rural Institute, Gandhi Gram, Dindugal visited ICAR-CICR, Regional Station during 29-30 July, 2021. Dr S Usha rani Principal Scientist (Agricultural Extension), Dr. Raja, Principal Scientist (Agronomy) and Dr. A. Sampath Kumar, Scientist (Plant Pathology) interacted with students and highlighted the research contribution of the Station. Field and laboratory visits were also arranged during the visit.



Orientation workshop under IRM project at ICAR-CICR

ICAR-CICR, Nagpur organized an orientation workshop of the project "Insecticide Resistance Management (IRM): Dissemination of Pink bollworm Management Strategies" on July 30, 2021 through Video Conferencing. The project is funded by Department of Agriculture, Cooperation & Farmers' Welfare (Crops Division), Ministry of Agriculture & Farmers' Welfare, Government of India under Centrally sponsored scheme on "NFSM: Commercial Crops". Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur chaired the workshop. ICAR-CICR, Nagpur is the nodal agency to implement the project through ICAR-CICR and 10 State Agricultural Universities. The project is aimed at dissemination of Pink bollworm management strategies in Bt cotton in eight cotton producing states viz., Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Telangana, Karnataka, Tamil Nadu and Haryana covering 21 districts in an area of 1050 acres. Preparedness for implementation of the project in the current crop season was discussed at length. Dr V. S. Nagrare, Principal Scientist & Principal Investigator of the project, Dr Nandini Gokte-Narkhedkar, Head I/c, Crop Protection Division, Dr S. M. Wasnik, Principal Scientist (Ag Extension), Dr V. Chinna Babu Naik, Senior Scientist (Ag Entomology), Dr Shailesh Gawande, Scientist (Plant Pathology), Dr Dipak Nagrale, Scientist (Plant Pathology), Dr Neelkanth Hiremani, Scientist (Plant Pathology) and Dr Rachna Pande Scientist (Ag Entomology) from ICAR-CICR Nagpur, Dr SS Patil, SMS from KVK, project coordinators from 21 districts of 8 states participated in the Workshop.

Scientists' Corner

Publications, Awards, Recognitions and special assignments

- ✓ **Award:** Dr. M. Saravanan, Scientist (Plant Breeding), ICAR-CICR, Nagpur received “**Bharat Ratna Mother Teresa Gold Medal Award**” by Global Economic Progress & Research Association (GEPRA), New Delhi on July 24, 2021.

Publications

- ✓ Verma SK, Tuteja OP, Kumar R, Sain SK, Paul D, Monga D, Waghmare VN (2021). Inheritance pattern of resistance to cotton leaf curl disease (CLCuD) in *Gossypium hirsutum* L. *J. Cotton Res. Dev.* 35(2): 197-203.
- ✓ Saravanan M, Misra RC, Mahajan SS, Mohan P, Waghmare VN (2021) Exploration, characterization and conservation of cotton (*Gossypium* spp.) encompassing colour cotton from Tripura, India. *Int. J. Curr. Microbiol. App. Sci.* 10(02): 3007-3016.
- ✓ Tamboli M, Mawle S, Saravanan M, Mahajan SS, Waghmare VN (2021) Molecular characterization of germplasm accessions of *G. hirsutum* using SSR markers. *Int. J. Curr. Microbiol. App. Sci.* 10(03): 324-331.

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

- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur participated in the Tree plantation Programme in ICAR-CICR Campus on the occasion of Bank's Day on July 01, 2021.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur attended the ICAR-Directors Conference held on July 02, 2021 through video conferencing under the chairmanship of Dr T. Mohapatra, Secretary (DARE) & DG (ICAR), New Delhi.
- ✓ Dr Y. G. Prasad, Director, ICAR- CICR, Nagpur along with all the Heads of Division, Dr S. K. Shukla, GTC, ICAR-CIRCOT, Dr MV Venugopalan, Dr Vinita Gotmare, Dr V Nagrare, Dr Sunil Mahajan, Dr K Velmourougane and Dr K P Raghavendra attended the Institute Technology Management Committee (ITMC) virtual meeting organized by Dr. Balasubramani I/c ITMC on July 03, 2021.
- ✓ Dr G Balasubramani, Member Secretary, CICR-IBSC organized 21st IBSC meeting of ICAR-CICR on July 06, 2021. The meeting was chaired by Dr YG Prasad, Director ICAR-CICR, Nagpur and was attended by Dr AK Das, DBT Nominee, ICAR-CCRI, Nagpur (virtually), Dr BD Deshmukh, Medical Officer, Dr Amit Bafana, CSIR-NEERI, Nagpur (virtually). Dr VN Waghmare, Dr Suman Bala Singh, Dr Rishi Kumar (virtually), Dr S Manickam (virtually), Dr VS Nagrare, Dr KP Raghavendra and Dr HB Santosh participated in the meeting.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur and Dr Nandini Gokte, I/c Head Division of Crop Protection, ICAR- CICR, Nagpur participated as speakers to discuss for collaboration between institutes and AICRPs during the zoom meeting of AICRP-BC Annual Review Meet being organized by ICAR-NBAIR on July 14, 2021.
- ✓ Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head, I/C, and Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa surveyed the villages of Jind and Hisar districts for infestation of pink bollworm on cotton crop on July 14, 2021.
- ✓ Dr V. S. Nagrare attended meeting of Board of Studies of Dr PDKV, Akola on July 15, 2021 (Online)
- ✓ Dr. H. B. Santosh, Scientist (Plant Breeding), ICAR-CICR, Nagpur participated in webinar on "Excellence in Peer Review: How to be an effective peer reviewer" organized by Taylor and Francis Reviewer Training Network on July 16, 2021.
- ✓ Dr. Rishi Kumar, Principal Scientist (Entomology), Dr. S.K. Sain, Principal Scientist (Plant Pathology), and Dr. Amarpreet Singh, Scientist (Agronomy) visited the farmer's fields in Sahuwala-2, Randhawa, Kanwarpura, Nirban villages of Sirsa for cotton crop survey and to identify MGMT villages on July 17, 2021.

- ✓ Dr. H. B. Santosh, Scientist (Plant Breeding), ICAR-CICR, Nagpur participated (virtual) and presented (oral) a paper on 'Identification of early maturing Bt cotton (*Gossypium hirsutum*) genotypes having high yield potential under high density planting system' in an International Web Conference on "Innovative and Current Advances in Agriculture and Allied Sciences" (ICAAAS-2021) held during July 19-21, 2021.
- ✓ Dr. S.K. Sain, Principal Scientist (Plant Pathology), ICAR-CICR, Regional Station, Sirsa received Fellow Award from Society for Scientific Development in Agriculture and Technology Meerut (U.P) in International Web Conference on Innovative and Current Advances in Agriculture and Allied Sciences (ICAAAS-2021) held during July 19-21, 2021. He also received 'Best Oral Paper Presentation Award 2021' on "Comparative evaluation of biological control agents and chemicals for management of soil-borne diseases in upland and desi cotton" under the theme: New frontiers in disease and pest management. He acted as Co-Chairman in Technical Session VI: Agroforestry, livelihood and sustainable management practices.
- ✓ Dr. Amarpreet Singh, Scientist (Agronomy), ICAR-CICR, Regional Station, Sirsa received Best Oral Paper Presentation Award 2021 on 'Effect of organic and inorganic sources of fertilizers on productivity of cotton-wheat cropping system in North India' presented during the "International Web Conference on Innovative and Current Advances in Agriculture and Allied Sciences" (ICAAAS-2021) held during July 19 to 21, 2021. He also received the "Excellence in Research Award" by the 'Society for Scientific Development in Agriculture & Technology (SSDAT)' during the same conference.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur chaired first meeting of IJSC on July 22, 2021. All IJSC members from ICAR- CICR, Nagpur & Regional stations attended the meeting through virtual mode.
- ✓ Dr V. S. Nagrare attended first biannual subcommittee meeting of 'National Network of Plant Health Experts' on July 22, 2021 Organized by National Institute of Plant Health Management (NIPHM), Hyderabad (Online)
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur along with Dr SK Verma, I/c Head ICAR - CICR, Regional Station, Sirsa participated in the Mid-term Review for XXVI Regional Committee Meeting of ICAR-Regional Committee No. V Comprising the states of Punjab, Haryana and Delhi on July 27, 2021 organized by Director, IASRI, New Delhi.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur participated as guest of honour in commemoration of 75th Year of India Independence (Azadi ka Amrut Mahotsav) and celebration of 37th ICAR-CCRI, Nagpur foundation day organized by ICAR- CCRI, Nagpur on July 28, 2021.
- ✓ Dr. S. Manickam, Principal Scientist, ICAR-CICR, Regional Station, Coimbatore was nominated as member in the Selection Committee for filling up of vacant post of Skilled Supporting Staff from amongst the Temporary Status Casual Labourers of ICAR-Sugarcane Breeding Institute, Coimbatore by regularization and the Committee Meeting was held on 28 July, 2021.
- ✓ Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head, I/C, and Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa attended 1st Interstate Consultative Committee Meeting on July 30, 2021 through video conference and presented the status of cotton crop in North Zone during 2021-22.
- ✓ Dr A.H. Prakash, delivered a talk on "Strengthening cotton-based production system through recent technologies" during the Workshop on "Doubling of Farmer's Income through strengthening KVKs with Inclusive Technologies and Innovative approaches" organized by ICAR-Agricultural Technology Application Research Institute (ATARI), Zone XI during 30-31 July, 2021 through Webinar. More than 150 persons from KVK and State Department officials from Karnataka, Kerala and Lakshadweep participated in the Workshop.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur along with Dr MV Venugopalan, Dr. Ramkrushna visited the Cottonguru organic farm at Ghantanji, Yavatmal on July 31, 2021 where ICAR- CICR varieties are being demonstrated.

Farmers' Corner

Cotton farmer from Adilabad successfully managed the pest incidence through technological interventions under Front Line Demonstration

Agriculture is the most predominant sector of the economy in Adilabad district of Telangana as 80 percent of the population is engaged in agriculture and allied activities for their livelihood. Among the various agricultural crops, cotton is an important commercial crop grown in the region for time immemorial. Due to damages caused by the infestation of sucking pests and pink bollworm, farmers in the district suffers yield losses in cotton for past few years. To facilitate the stressed cotton farmers with appropriate plant protection technological interventions, the Scientists from Agricultural Research Station (ARS), Adilabad, Professor Jayashankar Telangana State Agricultural University (PJTSAU), Telangana devised Front Line Demonstrations programs with the support from ICAR- Central Institute for Cotton Research (CICR), ICAR - AICRP on cotton under NFSM-CC-Front Line Demonstration program.

Shri. P. Sanjeev S/o Narsiah is the resident of Seethagondi village, Gudihatnoor Mandal is one among the stressed cotton farmers in Adilabad district. He has been cultivating cotton since 2000. He is a marginal farmer owns less than three hectares land with black cotton soil. For the past four years, he cultivated cotton under rainfed condition and witnessed yield losses due to infestation of sucking pests and pink bollworm. During 2019- 20, he cultivated cotton in six acres area and expected higher yield from the crop. Due to the heavy infestation of sucking pests as well as pink bollworm, yield declined to 50 to 60%. Due to escalated input cost and less yield, he realized lower net returns in that year.



Shri. P. Sanjeev



Under FLD program, with the technical guidance and advisories from the Scientists of ARS and officials from local Agricultural Department, Shri. Sanjeev cultivated cotton during 2020-21 again. During the crop season, scientists regularly visited and provided technical guidance through training and participatory programs for effective pest management. He adopted the pest management strategies like seed treatment, installation of yellow sticky traps, pheromone traps, spraying of Azadirachtin (1500 ppm) at flower initiation stage, plucking of rosette flowers, use of Tricho-cards and ETL based sprayings with CIBRC label claim pesticides including agronomical management till the end of the crop. As a result, he obtained 1810 kg/ha seed cotton yield with B:C ratio of 1:1.92 as against other farmers average yield (1530 kg/ha) & B:C ratio (1:1.60).

Information by

K. Rajashekar, Scientist (Ento.), Cotton Scheme, ARS, Adilabad.

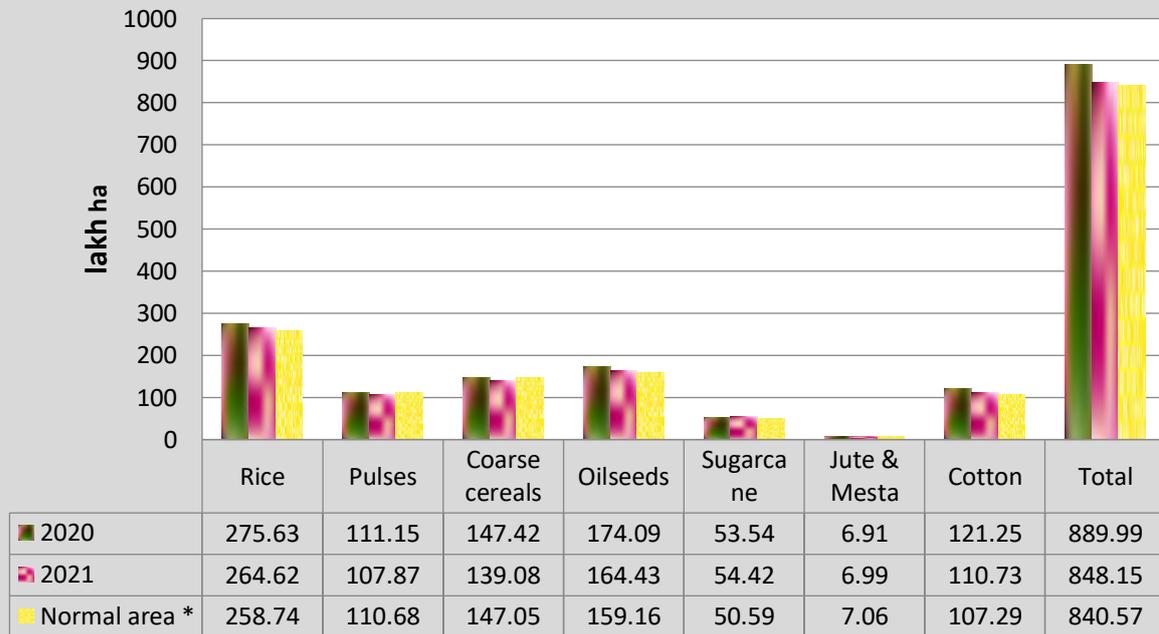
Dr. Sreedhar Chauhan, Principal Scientist (Agro.), AICRP-Soybean, ARS, Adilabad.

Dr. D. Mohan Das, Scientist (Agro.), Cotton Scheme, ARS, Adilabad

Cotton Statistics and Trade

COTTON SCENARIO DURING THE MONTH OF JULY 2020

Kharif cropped area (as of 30.07.2021) compared to corresponding week of 2020



*Normal area of corresponding week

As of July 2021, about 110.73 lakh ha area was covered under cotton when compared to 107.29 lakh ha of the corresponding week of 2020 registering an increase of 3.44 lakh ha in the cropped area under cotton.

State wise Cotton Area as on 30.07.2021 compared to corresponding week of 2020 (lakh ha)

States	Normal area	Normal area of corresponding week	2021-22			2020-21		
			Bt	Non Bt	Total	Bt	Non Bt	Total
Andhra Pradesh	6.12	3.22	2.38	0.02	2.40	4.19	0.04	4.23
Telangana	18.09	16.40	19.89	0.20	20.09	21.49	0.22	21.71
Gujarat	26.09	22.55	19.59	2.18	21.77	19.95	2.22	22.17
Haryana	6.56	6.46	6.81	0.07	6.88	7.30	0.07	7.37
Karnataka	6.47	3.57	4.17	0.09	4.26	4.59	0.09	4.68
Madhya Pradesh	6.06	5.69	5.68	0.30	5.98	5.91	0.31	6.22
Maharashtra	42.13	38.67	36.21	1.91	38.12	39.13	2.06	41.19
Odisha	1.47	1.44	0	1.80	1.80	1.66	0	1.66
Punjab	2.86	3.66	3.0	0.40	3.04	4.96	0.05	5.01
Rajasthan	5.78	5.36	5.67	0.30	5.97	6.40	0.34	6.74
Tamil Nadu	1.54	0.04	0.05	0.01	0.06	0.05	0.01	0.06
Others	0.42	0.22	0	0.37	0.37	0.37	0	0.22
All India	123.59	107.29	103.45	7.29	110.74	110.73	5.41	121.26

Source: Directorate of Economics and Statistics

At the state wise level, increase in area under cotton when compared to the corresponding week has been registered in the States of Telangana (3.69 lakh ha), Haryana (0.42 lakh ha), Karnataka (0.69 lakh ha), M.P. (0.29 lakh ha), Odisha (0.36 lakh ha), Rajasthan (0.61 lakh ha) and Tamil Nadu (0.01 lakh ha). Rest of the cotton growing States viz., Andhra Pradesh (0.82 lakh ha), Gujarat (0.78 lakh ha), Punjab (0.62 lakh ha) and Maharashtra (0.55 lakh ha) recorded less area under cotton compared to the corresponding period.

Lokmat Times 21/7/2021

Adopt sustainable practices in cotton cultivation: Dr Prasad

LOKMAT NEWS NETWORK NAGPUR, JULY 20

Indian Council of Agricultural Research (ICAR), New Delhi launched a tree plantation drive across the country with a mission to plant 10 lakh trees to commemorate 75 years of independence of the country (Azadi Ka Amrut Mahotsav) and 93rd foundation day of ICAR.

ICAR-CICR, Nagpur joined the nation-wide campaign by taking up plantation drive on Panjari research farm.

In the first phase, seventy-five saplings of fruit and medicinal plants were planted.

ICAR-CICR also organised a virtual conference under the theme "Atmanirbhar Krishi" (self-reliant agriculture). Former agriculture com-

ICAR-CICR PLANTS 75 SAPLINGS OF FRUITS, MEDICINAL VALUE



Staff of ICAR-CICR during the tree plantation drive on Panjari research farm.

Director of CICR Dr Y G Prasad urged the scientists and other staff of the institute to expand the mission of tree plantation to all adopted villages under 'Mera Gaon Mera Gaurav' (My Village My Pride), Tribal Sub-Plan and Scheduled Caste Special Component Plan (SCSP) with farmers' participation.

Dr Y G Prasad emphasised on adoption of sustainable practices in cotton cultivation for reducing cost of cultivation.

Head of KVK, Nagpur Dr Sunil N Rokde organised the online interaction meet with farmers.

Heads of divisions, scientists and staff of CICR and KVK were also present on the occasion.

missioner, Dr C D Mayee, GoI and ex-Chairman of Agricultural Scientist Recruitment Board (ASRB) was the chief guest and addressed farmers to boost cotton productivity for higher profitability.

Times of India, 21 July 2021

Central Institute for Cotton Research bags ICAR Award



ICAR-Central Institute for Cotton Research (CICR) bagged an ICAR Award 'Rajarshi Tandon Rajbhasha Puraskar for 2019-20' from Union agriculture minister Narendra Singh Tomar

in the 93rd foundation day of ICAR held at New Delhi recently. The minister gave away 16 ICAR Awards in four major categories in the programme and complimented ICAR for carrying out commendable works in various fields of agricultural and allied sciences by both scientists and farmers. In commemoration of the run-up to 75 years of India's independence, ICAR launched tree plantation drive 'Har med par ped' across the country with a mission to plant 10 lakh trees. ICAR-CICR, Nagpur, joined the nation-wide campaign by taking up plantation drive at Panjari research farm which will be expanded to all adopted villages with farmers participation. Dr YG Prasad, director of ICAR-CICR, organized a virtual farmer interaction session to mark the ICAR foundation day. Dr CD Mayee, ex-chairman, ASRB, inaugurated the meet and addressed farmers to boost cotton productivity.

CICR launches plantation drive to mark 'Azadi ka Amrut Mahotsav'

The Hitvada, 19 July, 2021

Staff Reporter

COMMEMORATING the run-up to celebration of 75th anniversary of India's Independence through 'Azadi Ka Amrut Mahotsav', ICAR has launched plantation drive 'Har Med Par Ped' across the country with a mission to plant 10 lakh trees. ICAR-Central Institute for Cotton Research (CICR), Nagpur joined the nation-wide campaign by taking up plantation drive at Panjari research farm.

The initial phase of the drive covered planting of 75 saplings consisting of fruit and medicinal plants. Dr Y G Prasad, Director, ICAR-CICR and Chairman, Krishi Vigyan Kendra (KVK) of CICR, urged the scientists and other staff of CICR to expand the mission of tree plantation to all adopted villages under 'Mera Gaon Mera Gaurav' (My Village My Pride) drive, Tribal Sub-Plan and Scheduled Caste Special Component (SCSP) with farmers' participation. Dr Prasad organised a virtual farmer interaction session to mark ICAR Foundation Day. CICR also organised a virtual conference under 'Atmanirbhar Krishi'. Dr C D Mayee, former Chairman of Agricultural Scientist Recruitment Board, inaugurated the meet and addressed farmers to boost cotton productivity for higher profitability. Dr Y G Prasad emphasised upon adoption of sustainable practices in cotton cultivation for reducing cost of cultivation. Dr Sunil N Rokde, Head, KVK, Nagpur organised the on-line interaction meet with farmers. Heads of divisions, scientists and staff of CICR and KVK participated in Foundation Day celebrations.



Dr Y G Prasad, Director of CICR, and staff during plantation drive.

केन्द्रीय कपास अनुसंधान को पुरस्कार

नागपुर, व्यापार संवाददाता

वर्धा रोड स्थित भा.क.अनु.प. केन्द्रीय कपास अनुसंधान संस्थान को 'ख' क्षेत्र के अंतर्गत वर्ष 2019-20 के लिए राजभाषा (हिंदी) कार्यान्वयन के क्षेत्र में उल्लेखनीय कार्य करने के लिए भारतीय कृषि अनुसंधान परिषद, दिल्ली के 93वें स्थापना दिवस एवं पुरस्कार वितरण के आभासी समारोह में परिषद का प्रतिष्ठित 'राजर्षि टंडन राजभाषा पुरस्कार (प्रथम)' प्रदान किया गया. संस्थान को लगातार तीसरी बार राजभाषा (हिंदी) कार्यान्वयन के क्षेत्र में उल्लेखनीय कार्य करने के लिए परिषद का यह गौरवान्वित पुरस्कार प्राप्त हुआ है. स्थापना दिवस व पुरस्कार वितरण समारोह की अध्यक्षता केन्द्रीय कृषि और किसान कल्याण मंत्री नरेंद्र सिंह तोमर ने की. इस अवसर पर एक ऑनलाइन कृषि प्रौद्योगिकी हेतु एक अभिनव एकीकृत सूचना प्रसार प्रणाली 'किसान सारथी' का शुभारंभ किया गया. समारोह में मुख्य रूप से मंत्री पुरुषोत्तम रूपाला, भा.क.अनु.प. के उपाध्यक्ष अश्विनी वैष्णव, केन्द्रीय रेल मंत्री, संचार तथा कलाश चौधरी, शोभा करंदलाजे व डॉ. त्रिलोचन महापात्र विशिष्ट अतिथि के रूप में उपस्थित थे.

Navbharat, 30 July, 2021

The Hitvada, 19 July 2021

CICR bags 'Rajarshi Tandon Rajbhasha Puraskar'

Staff Reporter

The city-based ICAR institute - Central Institute for Cotton Research (CICR) - has bagged ICAR Award 'Rajarshi Tandon Rajbhasha Puraskar' for the year 2019-20. The award ceremony took place on virtual platform.

Nagpur-based ICAR-CICR bagged 'Rajarshi Tandon Rajbhasha Puraskar' for the year 2019-20 for commendable performance in use of Hindi. This is the third consecutive year the institute has received this award given in recognition of the outstanding efforts on use of Hindi language by conducting frequent workshops, creating awareness on use of 'Rashtrabhasha' in official communications etc.

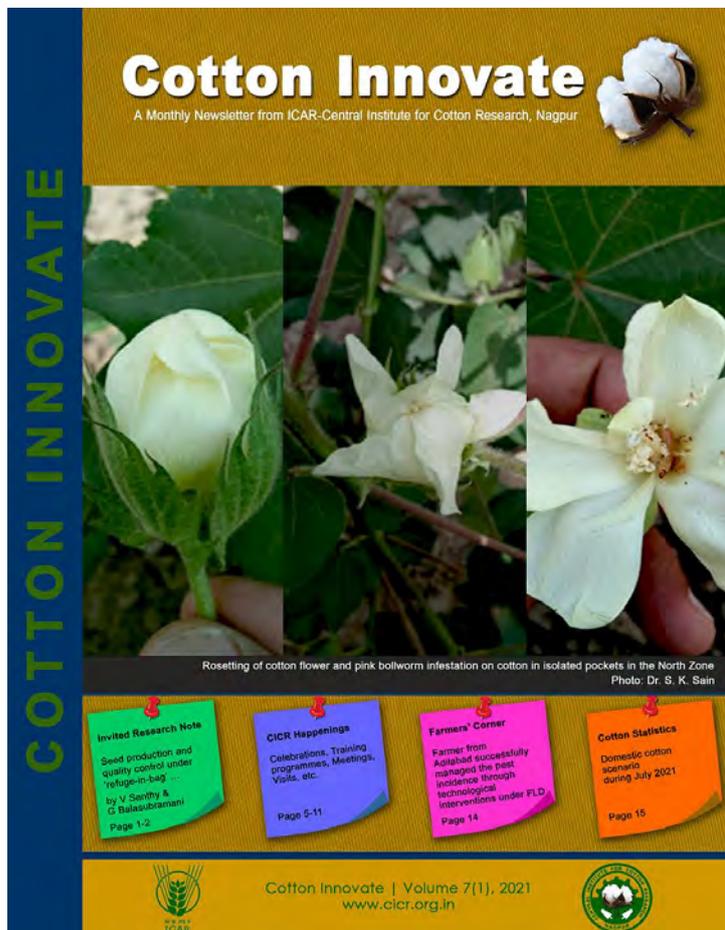
Narendra Singh Tomar, Union Minister of Agriculture and Farmers' Welfare, presented 16 ICAR Awards in four major categories on the occasion of 93rd Foundation Day of ICAR, in a virtual programme. An innovative integrated information dissemination system 'Kisan Sarathi' to serve as an on-line Agricultural Technology Platform was launched on the occasion.

Parshottam Rupala, Union Minister of Fisheries, Animal Husbandry and Dairying, and Vice-President of ICAR; Ashwini Vaishnaw, Union Minister of Railways, Communications and Electronics & Information Technology; Kailash Choudhary, Shobha Karandlaje, Union Ministers of State for Agriculture and Farmers' Welfare; Dr Dilcham Mohapatra, Secretary (DARE) and Director General of ICAR, were the guests of honour. The dignitaries virtually felicitated institutions, scientists and farmers and conferred awards. Among 50 farmers honoured, 12 were women.

राजर्षि टंडन राजभाषा पुरस्कार

नागपुर। वर्षों रोड स्थित भा.क.अनु.प. केन्द्रीय कपास अनुसंधान संस्थान को 'ख' क्षेत्र के अंतर्गत वर्ष 2019-20 के लिए राजभाषा (हिंदी) कार्यान्वयन के क्षेत्र में उल्लेखनीय कार्य करने के लिए 'राजर्षि टंडन राजभाषा पुरस्कार (प्रथम)' प्रदान किया गया। भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के 93वें स्थापना दिवस एवं पुरस्कार वितरण के आभासी समारोह में संस्थान को परिषद का प्रतिष्ठित पुरस्कार दिया गया। संस्थान को लगातार तीसरी बार राजभाषा (हिंदी) कार्यान्वयन के क्षेत्र में उल्लेखनीय कार्य करने के लिए परिषद का यह गौरवान्वित 'राजर्षि टंडन राजभाषा पुरस्कार (प्रथम)' लगातार तीसरी बार प्राप्त हुआ है। समारोह की अध्यक्षता केन्द्रीय कृषि और किसान कल्याण मंत्री नरेंद्र सिंह तोमर ने की। इस अवसर पर ऑनलाइन कृषि प्रौद्योगिकी हेतु एक अभिनव एकीकृत सूचना प्रसार प्रणाली 'किसान सारथी' का शुभारंभ किया गया। समारोह में मुख्य रूप से पुरुषोत्तम रूपाला, केन्द्रीय मत्स्य पालन, पशुपालन और डेयरी मंत्री एवं भा.क.अनु.प. के उपाध्यक्ष अश्विनी वैष्णव, केन्द्रीय रेल मंत्री, संचार तथा इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी कलाश चौधरी, सुश्री शोभा करंदलाजे, कृषि एवं किसान कल्याण राज्य मंत्री तथा डॉ. त्रिलोचन महापात्र सचिव (डेयरी) एवं महानिदेशक, भा.क.अनु.प. विशिष्ट अतिथि के रूप में उपस्थित थे।

Dainik Bhaskar 26 July, 2021



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