

Cotton Innovate

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



Cotton Leaf Curl Disease (CLCuD) symptoms on upland cotton in North India (Photo: Dr SK Sain)

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www.cicr.org.in



COTTON INNOVATE

Invited Research Note

An insight into metabolomics for cotton improvement

Pooja Verma and D. Blaise

ICAR – Central Institute for Cotton Research (CICR), Nagpur

Plants are known to produce a diverse group of metabolites that are, though structurally and functionally different, significant in the growth and development of plants. Metabolites are vital components of plant metabolism owing to their influence on plant architecture, biomass, yield and quality attributes of different crops (Turner et al. 2016). The post-genomics era has witnessed huge developments in cutting-edge ‘Omics’ technologies including Metabolomics. Recent efforts in metabolomics with large-scale metabolite profiling have made an easy access to the global data sets of metabolites and their corresponding metabolic pathways in an extraordinary way. Earlier, the scope of metabolomics approach was limited to the identification of simple biomarkers, but now it has been redefined as a tool for determining and validating the active drivers involved in biological processes (Hamany Djande et al. 2020).

Application of metabolomics in cotton has been more integrated rather than independent. It has been used in integration with genomics, transcriptomics and proteomics to validate the resulting data sets and hypotheses. Back in 2013, first comprehensive analysis of metabolic changes in response to mutation in elongating fibres was provided through integrated genomics and metabolomic approach (Naoumkina et al. 2013). Consequently, in integration with transcriptomics, fibre metabolomes of two different cotton species (*Gossypium hirsutum* and *G. barbadense*) indicated how difference in only one metabolite can be responsible for managing the oxidative stress during fibre elongation and maturation and eventually the fibre length (Tuttle et al. 2020). Recently, some studies using independent non-targeted metabolic approaches have been used to identify resistance related (RR) metabolites against leaf spot disease (Khizar et al. 2020) and also the targeted metabolites and signal substances in response to K deficiency in cotton (Zhang et al. 2020).

Tools and approaches

Metabolomic strategies can be targeted, semi-targeted or untargeted, depending upon the research interest. If preliminary information pertaining to specific metabolite or metabolic pathway is available but a defined hypothesis is to be tested, targeted metabolomic approach is usually followed for providing deeper information and validation. The untargeted approach allows plethora of metabolites in a sample to be measured in their relative concentration under different conditions/stimuli/population, when no prior information is available. Thus, it offers an opportunity to find new metabolites. However, a limitation is the correct annotation and identification (Cambiaghi et al. 2017). Semi-targeted analysis lies in between two approaches wherein, the hypothesis is often undefined however, the list of metabolites is predefined. Gas Chromatography/Mass Spectrometry (GC/MS) and Liquid Chromatography/Mass Spectrometry (LC/MS) platforms are the ones, used predominantly in metabolomics for high throughput and reproducible results and detection of large number of metabolites. However, NMR spectroscopy is also used for detection and identification of metabolite even if it's unknown, albeit with a drawback of low sensitivity.

Metabolic footprints/ signatures to metabolic pathways

To get the comprehensive active biochemical status of cell, tissue or plant under specific stimuli or environmental stress, studies on qualitative as well as quantitative metabolic changes are performed. At ICAR-CICR, Nagpur the work on metabolomics was initiated and drought stress specific metabolic changes for tolerant and susceptible cotton genotypes have been mapped. This untargeted approach was also used to find out the novel drought stress specific indicator, if any. Deploying GC-MS as a tool for metabolomics, all the possible dimensions to cover the metabolic changes like solvents, different polarity columns, and sample preparation protocols have been standardized for cotton (Fig. 1). Furthermore, based on the expression of only one enzyme and its corresponding metabolite *i.e.*, oxalate oxidase & oxalate in leaf tissue, a new metabolic pathway ‘*Alarm photosynthesis*’ was first time investigated and validated in cotton. Extending the on-going work at ICAR-CICR, metabolite profiling, allelochemicals in particular, from different crops grown as cover crops in cotton have been analysed to explore their weed suppression potential, when grown along with cotton (Verma et al. 2021).

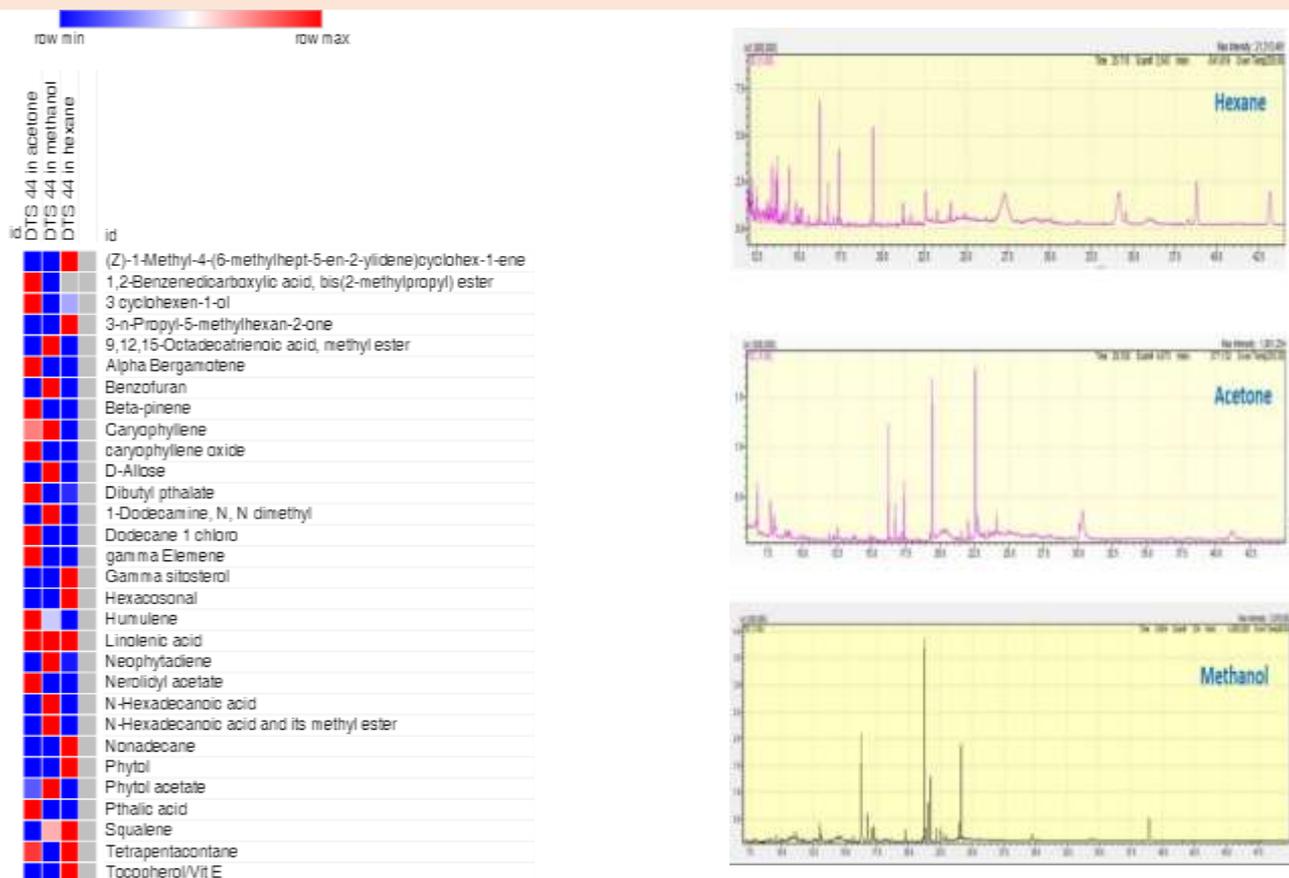


Fig. 1 Heat map and chromatograms (GC-MS) representing differential expression of metabolites with respect to solvent in a cotton genotype

Research on targeted metabolomics has also been initiated at ICAR-CICR Nagpur by undertaking the profiling of phytohormones in cotton. It will not only provide the quantitative snapshot of physiological status of cotton tissues under different stress/stimulus but also facilitate the correlation of fibre traits and other important quality parameters with interplay of phytohormones. Phenotyping in cotton is an area which has not been touched much in relation to metabolomics. Therefore, future focus can be directed towards use of metabolomics in understanding the environmental factors that influence the genome and eventually the phenotype and vice-versa.

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Low cost drip – Cost effective and precision irrigation tool in cotton

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Cotton is one of the identified crops for adoption of drip irrigation commonly known for its response. However, accommodating higher plant population per unit area requires longer length of laterals and a greater number of drippers for water distribution and delivery. This results in higher cost for drip system in cotton. The present subsidy scheme for promotion of drip irrigation technology in cotton is for a specific layout size of 1 ha (100 x 100 m). Any extra cost over and above the 100 x 100 m field dimension has to be met by the farmer. Additional cost of connecting pipes from water source and installation is to be borne. Thus, on an average an extra cost of Rs. 30,000/ ha is involved for adoption of drip in cotton under high density planting. The higher cost of drip appears to be a hindrance for adoption by farmers. Keeping this in view, a low-cost drip system was developed after rigorous testing procedures for optimum efficiency at ICAR-CICR, Coimbatore.

Drip System with paired row planting



For low cost drip system, single Linear Low-Density Polyethylene (LLDPE) lateral was placed within the pair (60 cm) of paired rows planted cotton (120/60 x 60 cm; 120 cm between paired rows and 60 cm within the pair) for water distribution and drippers were positioned at 60 cm interval (intra-row spacing of 60 cm) for water delivery to two plants.

Microtube drip system with paired row planting

In a low cost micro-tube system, one LLDPE lateral was used to irrigate 2 paired rows of cotton (4 single rows) and single lateral is placed in between the two paired rows (120/60x60 cm) alternatively and micro tubes were inserted in both sides of the lateral in 60cm interval and extended to either side (2 rows of cotton in each side) of the pairs for water delivery and placed between the plants.



Polytube drip system with paired row planting



For low cost poly-tube lateral system, instead of LLDPE lateral, polytubes (150 micron) was used. The polytubes were punctured on single side at regular intervals (60 cm) and placed within the pair (60 cm) of paired row planted cotton. The polytubes were positioned in such a way that perforated holes faced towards bottom side for water delivery and were stretched and fixed. The poly tubes could be used for two years.

Yield and yield attributes

Recommended dose of 90-20-38 kg N-P-K/ha was applied in the form of urea, super phosphate and muriate of potash. In drip irrigation, N and K were applied through fertigation in five equal splits while P was applied to soil at the time sowing. Amongst the three low cost systems, higher seed cotton yield (27.1 q/ha) was recorded in drip system with paired row planting. Microtube and polytube drip systems produced yields of 25.3 and 26.2 q/ha, respectively. The mean total quantity of irrigation water used for drip systems was 206.7 mm compared to 355 mm with surface irrigation through ridge-furrow irrigation. Thus, drip system could save 41.8 per cent of irrigation water in comparison to ridge and furrow irrigation method. Higher water use efficiency of 49.6 kg/ha-cm was realized with drip irrigation method. The drip system of dripper-based delivery found higher uniformity coefficient of 97.4% followed by poly tube drip systems (95.1%) and the least was with microtube system (93.5 %).

Economics of low-cost drip system

The cost of drip system with normal planting worked out to Rs. 1,40,000/ha. It was possible to reduce the cost of drip system in paired row planted cotton by 26.8% (Rs 1,02,500/ha), by 33.6% with microtube drip system (Rs 93,000/ha) and by 52.3% with polytube (150 micron) drip system (Rs 66,840/ha) compared to drip system with normal planting. Earlier demonstrations on poly tube drip system in ELS Bt Cotton resulted in water saving to the tune of 36.0 per cent and yield increase of 25.4 per cent. This work received appreciation by Indian Society of Agronomy, New Delhi. This low-cost drip system developed by ICAR-CICR can help farmers to adopt drip irrigation system in cotton for higher water use efficiency and higher productivity.

CICR Happenings

Farmers training cum workshop program on pink bollworm and boll rot management at Wani, Yavatmal, Maharashtra

One day “Farmers field training cum workshop” program on “Integrated management of pink bollworm and boll rot management in cotton” was jointly organized by ICAR-CICR, Nagpur and State Agricultural Department (Dist.-Yavatmal) at village-Naigaon (Bk), Taluka-Wani, District-Yavatmal on August 05, 2021. The cotton crop in the area was about 50-55 days old and rosette flowers were noticed in some villages in the Wani taluka, Yavatmal. However, no male adult moths were observed in the pink bollworm pheromone traps. Dr Chinna Babu Naik suggested to properly destroy rosette flowers and to undertake spray of neem seed oil at early stages. Spray of chemical insecticides should be undertaken, only if infestation of pink bollworm crosses above ETL with suggestion and recommendation from ICAR-CICR, Nagpur. Dr. Dipak T. Nagrale explained Myrothecium leaf spot, *Macrophomina* dry root rot, bacterial leaf blight was also noticed in the surveyed cotton fields in above visit more than 100 farmers attended the program.



Monitoring of cotton fields in Wardha and Yavatmal districts of Maharashtra

ICAR-CICR team comprising, Dr Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. M V Venugopalan (Principal Scientist, Agronomy & Head, PME Cell), Dr. V. Chinna Babu Naik, Senior Scientist (Entomology), ICAR-CICR, Nagpur along with Sh. Jagan Rathod, (SDAO, Pandharkawda) and Sh. Rakesh Dasarwar (TAO, Pandharkawda), state agricultural department staff also grace the program. Team of Rasi Seeds Pvt. Ltd. also assisted the programme. More than 50 farmers attended the interaction program. The team visited Wardha and Ralegaon cluster and also visited HDPS field trials (ICAR-CICR and Rasi Seed collaboration) on August 07, 2021. In addition to this, team visited farmers' fields in Wardha and Yavatmal and assessed the crop condition. Director, ICAR-CICR suggested the farmers to avoid spraying of insecticide mixtures. Dr. M. V. Venugopalan guided cotton farmers and highlighted the importance of canopy management in cotton. During the survey, Dr. V. Chinna Babu Naik explained to the farmers on integrated management of pink bollworm and sucking pests in cotton.





Interface meeting of ICAR-CICR with Institute of Pesticide Formulation Technology (IPFT), Gurgaon

Virtual interface meeting of scientists of ICAR-CICR, Nagpur and Institute of Pesticide Formulation Technology (IPFT), Gurgaon on “Formulation of Biopesticides - Way forward” on August 10, 2021. Dr Y.G. Prasad, Director, ICAR-CICR and Dr Jitendra Kumar, Director, IPFT led the interaction to explore possible collaboration between the two institutes in terms of product development including slow release nano-formulations for increased efficacy, field persistence and shelf-life. As a first step, an inventory of potential candidate biopesticides along with data documentation will be assessed for specific collaboration.



Stakeholder consultation on quality seed production and promotion and public sector bred varieties

Dr. Y. G. Prasad, Director ICAR-CICR Nagpur organized virtual Consultation on Quality seed production of public sector bred cotton varieties among Stakeholders on August 13, 2021. Dr. R K Singh ADG (CC), Dr. Z P Patel VC NAU, Dr V P Chovatia VC JAU, Dr. V.M. Bhale VC, PDKV, Dr Ashok Dhawan, VC, VNMKV, Dr Praveen Rao VC PJTSAU, Dr A Vishnuvardhan Reddy VC ANGRAU, Dr M B Chetty VC UAS, Dr N Kumar VC TNAU, Sh ML Arora Director (Commercial) NSC, Senior officials of SAUs, State Seed Corporations, Dr VN Waghmare, HoD, Dr A.H. Prakash, Project Coordinator (AICRP on Cotton), Dr S.K. Verma, Head i/c, CICR RS Sirsa, scientists from CICR, Dr S Manickam, Dr HB Santosh & Dr Santhy and breeders from invited SAUs participated. The consultation focussed on identification of promising varieties for seed production and demonstration of productivity potential in the recommended agro-ecology with tailored agronomy. The project proposal was submitted to Ministry of Textiles.

Independence Day celebration

The 75th Independence Day was celebrated on August 15, 2021 at ICAR-CICR, Nagpur and its Regional Stations at Coimbatore and Sirsa. The national flag (Tiranga) was hoisted and special address was given by Dr Y. G. Prasad, Director, ICAR-CICR at Nagpur. Dr Prasad during his Independence Day speech, reiterated the increasing need of quality research and extension in cotton for providing the monetary benefits to cotton farmers through technologies and out-reach programmes. Various recreational games were organized for the staff members of the institute. The Independence Day was celebrated following COVID19 guidelines and COVID appropriate behaviour. The celebration concluded with the distribution of gifts to the winners of the game and refreshments to all the staff of the institute.



Interaction meeting for project proposal under NEH fund

An online meeting was conducted under the chairmanship of Director, ICAR-CICR, Nagpur to discuss a project proposal received for funding under NEH fund on August 16, 2021. The proposals were received from Dean, College of Agriculture, Kyrdemkulai, Ri Bhoi, Meghalaya entitled "Rural bioentrepreneurship and livelihood security of small and marginal farmers of North Eastern Hill region through Integrated Farming Systems (IFS)" was presented online by Dr. Bhuvana Priya. The proposal was approved after thorough discussion for funding under NEH fund. Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head, (I/C), ICAR-CICR, Regional Station, Sirsa participated in the online Interaction meeting for project proposal under NEH fund for the financial year 2021-22 on August 16, 2021. The project activities envisaged are directed towards outreach and establishment of integrated farming system (IFS) units in selected villages for year-round income to tribal farmers.

Visit cum collaboration meeting with 'Lady Bamford Foundation'

A meeting was held under the Chairmanship of Dr. Y. G Prasad, Director, ICAR-CICR, Nagpur with Ms. Juhi Pandey, Technical Head, Lady Bamford Foundation (LBF) of JC *Bamford* (JCB) India Limited and her team on August 20, 2021 at ICAR-CICR Regional Station, Sirsa. The meeting was aimed to find out the possible collaboration of LBF under its CSR initiative with ICAR-CICR for enhancing cotton production, especially organic and traditional cotton production and value addition in Ballabharh, a non-traditional cotton growing region of Haryana.

Dr. S. K Verma, Head (I/c), Dr. Rishi Kumar, Dr. S. K Sain, Dr. Amarpreet Singh and Sh. Debashis Paul from ICAR-CICR, Regional Station, Sirsa and Dr. M. V Venugopalan, Head, PME Cell, Dr. N. G Narkhedkar, Head, Crop Protection from ICAR-CICR, Nagpur participated in the meeting. The LBF team also visited the Technology demonstration park at ICAR-CICR, Regional Station, Sirsa.



Survey and monitoring of insect pests in Yavatmal district of Maharashtra

ICAR-CICR team of scientists comprising Dr. V. Chinna Babu Naik, Senior scientist (Entomology), Dr. Dipak T. Nagrale, Scientist (Plant Pathology) and Dr. Chandrasekhar, N., Scientist (Agri. Biotechnology) and Sh. Sujit Kumbhare (Senior technician, CICR) surveyed and monitored the cotton crop for pink bollworm infestation, sucking pests and diseases in the villages of Pandharkawda taluka, District-Yavatmal (M.S.) dated August 21, 2021. During the survey, Dr. V. Chinna Babu Naik and Dr. Dipak T. Nagrale explained about cotton pests and disease management in cotton. Sh. Rakesh Dasarwar (TAO, Pandharkawda) and farmers participated in the visit.



Cotton Workshop organized by Cotton Corporation of India

Dr Y G Prasad, Director, ICAR-CICR, Nagpur made a presentation on “Efforts for maximization of cotton productivity” in the Cotton Workshop organized by Cotton Corporation of India, Mumbai on August 24, 2021. Dr S. Manickam, Principal Investigator (Crop Improvement), AICRP on Cotton, Coimbatore made a presentation on “Present status of extra-long staple cotton and way forward”. Shri Upendra Prasad Singh, IAS and Secretary MoT, GoI delivered the key note address on overview of cotton sector. Shri L.K. Gupta, Director (F) gave an overview of CCIs efforts on procurement and stakeholder engagement. Shri A.B. Chavan, Secretary, Textiles spoke on protocol for “Kasturi” brand of Indian cotton. Shri U.K. Vats, GM, APEDA presented the current status of organic cotton, certification and its potential. Shri R.K. Singh, ADG CC (ICAR) and Shri P.K. Agarwal, CMD, CCI gave their opening remarks on the workshop theme. Shri Panigrahi, CGM, CCI, Mumbai and Director, ICAR-CICR coordinated the virtual workshop in which >150 experts across cotton growing states and sectors participated. The cotton workshop focussed on enhancing cotton productivity and deliberated on specialty cottons, brand and value-chain development.

Visit of Hon'ble Minister to CICR Regional Station, Coimbatore

Shri. J. C. Madhuswamy, Hon'ble Minister for Law, Parliamentary Affairs, Legislation and Minor Irrigation, Government of Karnataka along with former minister (Sericulture) Mr. M Shivanna and his team visited CICR, Regional Station Coimbatore on August 24, 2021. During the visit, Dr. AH Prakash, Project Coordinator and Head briefed about the research achievements of the station. After the discussion Hon'ble Minister inaugurated the newly constructed polyhouse and visited field demonstrations. He also participated in tree plantation programme and planted coconut saplings.



Farmers' training programme in Chaaharwala, Khedi Kagdaana, Hanjira and Chadiwal, Sirsa

A one-day training programme was organized by ICAR- CICR Regional Station, Sirsa at Chaaharwala, Khedi Kagdaana, Hanjira and Chadiwal, Sirsa on August 26, 2021 to observe 'Azadi ka Amrit Mahotsav' at MGMG villages. Dr. Rishi Kumar, Principal Scientist (Entomology), and Dr. Amarpreet Singh, Scientist (Agronomy) coordinated the training programme. About 110 farmers from the villages participated actively in the programme. This visit was planned to survey the cotton crop and to discuss about the emerging problems and also to provide advisory. Field visits were conducted to understand the prevailing biotic and abiotic problems and crop condition. Group discussions with farmers were also held at various places to create awareness about the effective management of insect-pests and diseases in cotton.



Field survey of the affected cotton crop in village Kanwarpura, Sirsa

Dr. S. K. Sain, Principal Scientist (Plant Pathology) and Dr. Amarpreet Singh, Scientist, (Agronomy) visited the cotton fields of village Kanwarpura, District Sirsa (Haryana) on August 28, 2021. This visit was planned to identify the reason for parawilt, wilting, drying, and mortality of the cotton plants in farmers' fields. The field inspection indicated nematode infestation and root rot problem in 5-7 acres of area with 5-40% incidence in random patches. The interaction with farmers indicated that the same problem has been noticed in the last 3-4 years in scattered patches. Remedial measures were suggested.



Farmers Field Training cum Input Distribution at Bhadravati, Chandrapur under NFSM: IRM-PBW

One day "Farmers Field Training cum Input Distribution" at Bhadravati, Chandrapur under NFSM: IRM-PBW to the farmers under the aegis of IRM-PBW project at Thorana, Ralegaon, Shebal, Patala and Mangaon villages of Bhadravati and Warora tehshil of Chandrapur district on August 31, 2021. This training programme was coordinated by Dr. V. Chinna Babu Naik, Senior Scientist (Entomology) and District Coordinator IRM-PBW, Chandrapur, Dr. Prabhulinga T (Scientist), Mr. Mohan Narode (SRF IRM-PBW), and Mr. Bhushan Munjekar (YP-I -IRM-PBW). The team members distributed inputs kit comprising of Flonicamid 50 WG (60 g), Neem oil (1 litre), Chlorpyrifos 20 EC (1 litre), 2 yellow sticky traps, 2 pheromone traps, Trichogramma card (1 no.), Copper oxychloride 50 WP (500 g) and Streptocycline (3 packets of 6 g each) and a leaflet on the management of pink bollworm to 50 farmers of the adopted villages under the IRM-PBW program



Activities under Tribal Sub-Plan (TSP)

One day "Farmers field training cum demonstration of mass trapping of pink bollworm" was organized in the villages i.e. Shembal, Mangaon, Patala, Thorana and Ralegaon (Taluka-Bhadravati & Warora) on August 05, 2021 under (IRM-PBW Project). The programme was coordinated by Dr. V. Chinna Babu Naik, Senior scientist (Entomology) & District Coordinator, Dr. Dipak T. Nagrale, Scientist (Plant Pathology) and Mr. Sujit H. Kumbhare (Senior Technician), Sh. Mohan Narode, SRF (IRM-PBW) and Sh. Bhushan Munjekar YP-1(IRM-PBW)

One day "Farmers field training cum input distribution" program on management of pink bollworm, IPM and boll rot management in cotton was organized at tribal village- Masala-K, Taluka-Bela and village-Sitagondi, Taluka-Gudihatnur, Dist.-Adilabad (T.S.) on August 21, 2021 under Tribal Sub Plan (TSP) scheme.



The programme was coordinated by Dr. V. Chinna Babu Naik, Senior scientist (Entomology) & Nodal Officer (CICR-TSP), Dr. Dipak T. Nagrale, Scientist (Plant Pathology) and Dr. Chandrashekar, N., Scientist (Agril. Biotechnology) and Mr. Sujit H. Kumbhare (Senior Technician) and Mr. Haresh Maraskolhe (TSP YP-I).



A farmer's field training cum input distribution to tribal farmers in Mulchera, Chamorshi and Gadchiroli taluka, District-Gadchiroli (M.S.) on August 31, 2021. The programme was coordinated by Dr. Dipak T. Nagrale, Scientist (Plant Pathology), ICAR-CICR, Nagpur and Dr. V. Chinna Babu Naik, Senior Scientist (Entomology) & TSP CICR Nodal officer, Mr. Sujit Kumbhare, (Senior technician) ICAR-CICR, Nagpur.



Scientists' Corner

Publications, Awards, Recognitions and special assignments

- ✓ Velmourougane K, Blaise, D. Manikandan A, Savitha S, Waghmare, VN. (2021). Environmental impacts of herbicide tolerant crops and glyphosate-based herbicides. *Applied Ecology and Environmental Research*, 19(5): 3481-3504

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

- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur participated as panelist in the Online Annual Zonal Workshop of KVKs organized by ATARI, Pune on August 04, 2021.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur along with Dr. Blaise, I/c Head, Production, Dr. V N. Waghmare, I/c Head, Improvement, Dr. Nandini Gokte, I/c Head, Protection, Dr MV Venugopalan, Dr Jayant Meshram and Dr Ramkrushna GI participated in the meeting with Mr. Romit Sen, Associate Director, Water and Agriculture Institute for Sustainable Communities (ISC) to discuss the findings of research study on Climate-Cotton – Water Nexus and the resulting vulnerability on small and marginal farmers on August 06, 2021.
- ✓ Dr S. Usha Rani, Principal Scientist (Agricultural Extension) & Dr K. Baghyalakshmi, Scientist (Genetics and Plant Breeding) ICAR-CICR, Regional Station, Coimbatore attended online training program on “Climate Change: Challenges and Responses” (for women Scientists) Conducted by Centre for Disaster Management, Lal Bahadur Shastri National Academy of Administration, Mussoorie from 09 – 13 August, 2021 organized in collaboration with Department of Science and Technology, Ministry of Science & Technology, Government of India.
- ✓ Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur, I/c Heads, Division of Crop Improvement, Division of Crop Protection, Division of Crop Production, Regional Stations, Sirsa, Coimbatore and Dr MV Venugopalan participated in the meeting with team of Sustainable Agriculture Program WWF India on August 11, 2021 to discuss about their new initiatives of Regenerative Agriculture in Cotton Growing Landscape, Developing a prototype and use case for target specific & precision – based spraying build on accurate pest detection using near – infrared spectrometry and Seek guidance and technical support from ICAR-CICR on the above aspects.
- ✓ Dr. Y. G. Prasad, Director, ICAR-CICR chaired the ITMC meeting on August 12, 2021 to discuss the agenda items on collaboration projects and technology transfer (TOT). All the I/c Heads of Division, Improvement, Protection, Production, Dr. S. K. Shukla, Head, GTC, ICAR-CIRCOT, Nagpur and all the members of the ITMC participated in the meeting.
- ✓ Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head, (I/C), Dr. S. K Sain, Principal Scientist (Plant Pathology) and Dr. Amarpreet Singh, Scientist (Agronomy) Regional Station, Sirsa participated in training programme on “Safer cotton crop production and protection technologies” organized by progressive farmers of Kheti Virasat Mission (KVM) on August 13, 2021.
- ✓ Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur along with Dr. A H Prakash and Dr. S Manickam participated in the meeting organized by Cotton Section. O/o. Tx.C (Textile Commissioner Mumbai) for discussion on level of MSP for ELS Cotton on August 13 & 20, 2021 through video conferencing.
- ✓ Dr. Rishi Kumar, Principal Scientist, (Entomology) ICAR-CICR, Regional Station, Sirsa, delivered a lecture in certificate course on insecticide management to 50 Agro input dealers organized by HAMETI, Jind on August 14, 2021.

- ✓ Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr A.H. Prakash, PC & Head and Dr S. Manickam Principal Scientist (Genetics and Plant Breeding), ICAR-CICR, Regional Station, Coimbatore participated in video conferencing chaired by Dr T R Sharma DDG (CS) ICAR, New Delhi regarding increasing Productivity of Cotton and other issues on 18th August, 2021.
- ✓ KVK, ICAR- CICR observed Parthenium Awareness and Eradication week during 16th – 22nd August, 2021. During this week awareness amongst farmers, students of Agriculture and staff regarding health hazards, uprooting and eradication of grass were carried out.
- ✓ Dr. G. Balasubramani, Principal Scientist (Biotechnology) and Vigilance Officer (VO), ICAR-CICR Nagpur attended a 3-days online "Training Workshop for Vigilance Officers of ICAR Institutes" from 16-18 August 2021 conducted by ICAR-National Academy of Agricultural Research Management (NAARM), Hyderabad. Vigilance Officers of forty-four ICAR Institutes had attended the workshop virtually which imparted training on the duties and responsibilities of VO, disciplinary rules & procedures, preventive vigilance, conduct rules, RTI, purchase procedure, and establishment related matters.
- ✓ Dr P Valarmathi, Scientist (Plant Pathology) ICAR-CICR, Regional Station, Coimbatore attended International e-Conference on "Post-harvest Disease Management and Value Addition of Horticultural Crops" from 18 to 20 August 2021 organized by ICAR-IARI and Indian Phytopathological Society, New Delhi.
- ✓ Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head, (I/C), ICAR-CICR, Regional Station, Sirsa participated in the 23rd SAC (Scientific Advisory Committee) meeting of KVK, Sirsa and KVK, Fatehabad on August 23 and 26, 2021, respectively.
- ✓ ICAR-CICR & KVK, Nagpur celebrated the theme "Food and Nutrition for Farmers" during 24-26 August 2021. Live telecast of Hon'ble Agriculture Ministers address on 26th August was displayed for the benefit of 100 farmers and rural women.
- ✓ Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa, delivered online lecture on "Status of insecticide resistance and its management in whitefly" in a training programme on August 24, 2021, at PAU, Ludhiana. 85 scientists and students attended the lecture.
- ✓ Dr A.H. Prakash, PC & Head and Dr S. Manickam Principal Scientist (Genetics and Plant Breeding), ICAR-CICR, Regional Station, Coimbatore attended third Meeting of the Council of Administration of SIMA CD & RA on Friday, 27 August, 2021 virtually.
- ✓ Dr YG Prasad, Director, ICAR-CICR, Nagpur visited the field trials on HDPS to assess the performance of cotton varieties on 28th August, 2021 at Donad cluster of villages in Amravati district. Dr SB Singh, Dr MV Venugopalan, Dr AR Reddy, Dr V Santhy and Dr HB Santosh participated in the visit.
- ✓ **HRD Activities at ICAR-CICR, Nagpur:** Students of B.Sc./B.Tech Agriculture visited ICAR-CICR, Nagpur to get exposure in the field of agriculture and biotechnology during August, 2021 as a part of their degree requirement.

S.No.	Name of college	Number of student(s)	Date	Degree
1.	Vasantrao Naik College of Agricultural Biotechnology, Yavatmal	13	August 25, 2021	B. Tech. (Ag. Biotechnology)
2.	College of Agriculture, Baramati	1	August 25-31, 2021	B.Sc. (Agriculture)
3.	Vilasrao Deshmukh College of Agriculture Biotechnology, Latur	1	August 28, 2021	B. Tech. (Ag. Biotechnology)

Farmers' Corner

A successful desi cotton grower from Punjab

This success story is about Mr. Gurcharan Singh (55 years, Mobile No. 9465558592) S/o Gurdev Singh from Gobindgarh - Dabrikhana village in Faridkot district of Punjab, India. He had only primary education (5th class) and has been practicing agriculture since his childhood in six acres of land which was low in productivity due to salinity, low soil fertility and limited access to canal irrigation. Earlier, he was following the traditional paddy-wheat cropping system but due to brackish underground water application to paddy, soil health of his land started deteriorating. About 5 years ago in 2016, he visited Kisan Mela on Kharif crops organized by Punjab Agricultural University (PAU) at its Regional Research Station, Faridkot.



He interacted with various agricultural scientists about latest crop production and protection technologies. After visiting stall of desi cotton varieties, he was very much impressed with **LD-949** (latest desi cotton variety at that time) and decided to cultivate cotton in one acre on experimentation basis instead of rice in some part of his land.

Quality seed of the said variety was supplied by the university and the farmer followed all the cultivation practices as per recommended package of practices. Timely sown crop in the month of April during first year of cotton cultivation was key to his success as he realized 2450 kg of seed cotton yield/ha which was 33% higher compared to local variety. At the same time, his expenditure on pesticide sprays especially for whitefly was minimized. He was able to reap very good yield with just 2-3 irrigations owing to well distributed rainfall. Most of his produce was sold at premium price within his village itself as there was huge demand for lint of desi cotton. Since then, he has been regularly cultivating desi cotton at his farm and is very much satisfied with returns.

In addition, Dr Kulvir Singh, Scientist In-charge of FLD program on cotton advised him to improve soil fertility by addition of FYM and green manure. He adopted the recommended land reclamation practices and witnessed tremendous improvement in soil fertility of his land. With improvement in soil fertility, he started growing of vegetables at his farm for domestic consumption which increased his farm income.

Now he regularly participates in extension programs such as Kisan Melas, field days and crop seminars organized by extension centres of PAU. To prevent distress sale in the market, he stores his seed cotton to sell in future at a higher rate. He does not burn the paddy straw but rather ploughs it back into the soil to improve soil fertility towards sustainable productivity. The cultivation of desi cotton by adopting improved practices fetched him a net income of Rs. 75,000/- per ha.

**Information provided by,
Dr Kulvir Singh**

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Email: kulvir1974@gmail.com

Cotton Statistics and Trade

Cotton Scenario during the month of August 2021

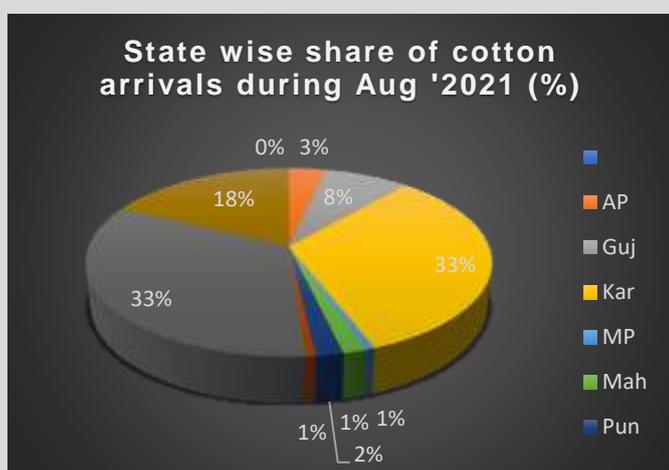
Isabella Agarwal and A R Reddy

Market Arrivals:

The cotton market arrivals during August 2021 were 7.9 thousand tonnes against 31.2 thousand tonnes during August 2020. The arrivals were highest from the Southern states viz., Karnataka and Tamil Nadu with share of 33% each followed by Telangana to the tune of 18% and Gujarat 8%. The rest of the cotton growing States contributed around 8% of the total cotton arrivals.



Source: <https://agmarknet.gov.in>



Source: <https://agmarknet.gov.in>

Cotton Area-2021:

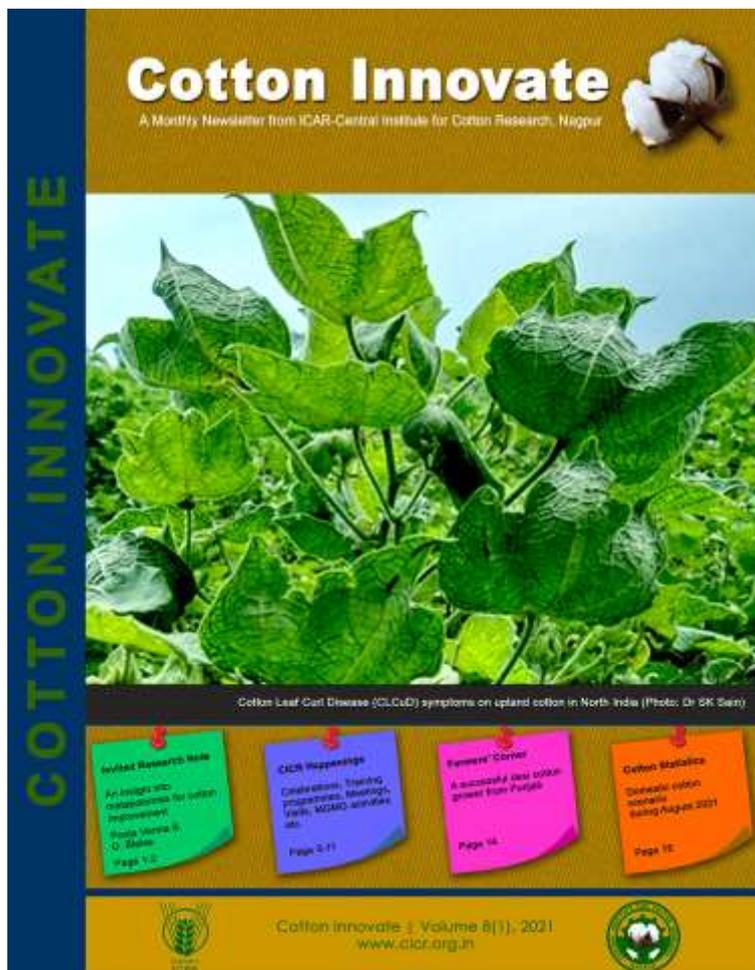
Around 118.13 lakh ha area coverage has been reported compared to the corresponding week (118.12 lakh ha) of the previous year. Increase in area under cotton has been registered for Telangana (2.49 lakh ha), Karnataka (1.16 lakh ha), Rajasthan (0.78 lakh ha), Odisha (0.39 lakh ha) and Haryana (0.37 lakh ha). While, the rest of the cotton growing states viz., Gujarat (2.73 lakh ha), Maharashtra (2.0 lakh ha), Andhra Pradesh (0.30 lakh ha), Madhya Pradesh (0.13 lakh ha), Punjab (0.12 lakh ha) and Tamil Nadu (0.05 lakh ha.) recorded a decline in the cotton area as compared to the corresponding period last year.

State wise cotton area as on 02.09.2021 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	5.11	4.76	0.05	4.81	5.49	0.06	5.54
Telangana	18.09	18.02	20.31	0.21	20.51	23.72	0.24	23.96
Gujarat	26.09	25.24	20.26	2.25	22.51	20.49	2.28	22.77
Haryana	6.56	6.51	6.81	0.07	6.88	7.30	0.07	7.37
Karnataka	6.47	5.12	6.15	0.13	6.28	6.78	0.14	6.92
Madhya Pradesh	6.06	6.28	5.84	0.31	6.15	6.12	0.32	6.44
Maharashtra	42.13	41.36	37.4	1.97	39.37	40.02	2.11	42.13
Odisha	1.47	1.56	0.00	1.95	1.95	0.00	1.71	1.71
Punjab	2.86	3.16	3.00	0.03	3.03	2.49	0.03	2.51
Rajasthan	5.78	5.39	5.86	0.31	6.17	6.35	0.33	6.68
Tamil Nadu	1.54	0.14	0.09	0.01	0.10	0.19	0.02	0.21
Others	0.42	0.22	0.00	0.37	0.37	0.00	0.22	0.22
All India	123.59	118.12	110.49	7.64	118.13	118.94	7.51	126.45

Source: Directorate of Economics and Statistics

More area coverage compared to normal area of corresponding week



Produced and published by

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

Chief Editor:

Dr. H. B. Santosh

Associate Editor, Cover page & Layout Design:

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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

Published by

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Citation: Cotton Innovate 2021, ICAR-Central Institute for Cotton Research, Nagpur, India, Volume: 08 (01), pp-17, available at http://www.cicr.org.in/cotton_innovate.html

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