

Cotton Innovate

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



Stem weevil of cotton, Photo By: Dr. K. Rameash

Invited Research Note

Cotton irrigation scheduling using remotely sensed evapotranspiration (ET)

Microbial dissolution of calcium carbonate: A novel ecofriendly approach to ease soil sodicity

Page 1-3

CICR Happenings

ARC Meeting 2022, Training programmes, Visit of Vice Chairman- AP Agriculture Mission, Student's Visit, etc.

Page 4-8

Farmers' Corner

Doubling Farmer's Income: Shri. Munigela Suresh from Burnoor Village of Adilabad district shares his success story

Page 10

Cotton Statistics

Cotton scenario during March 2021

Page 13

COTTON INNOVATE



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Research News Item

Cotton irrigation scheduling using remotely sensed evapotranspiration (ET)

B. Bhargavi, A. Manikandan and D. Blaise

Cotton is cultivated in varied soils, climates and agricultural practices under irrigated and rainfed areas in India. About 65% of cotton is grown in rainfed areas and 35% of cotton under irrigated conditions. Rainfed cotton crop is more frequently affected due to insufficient as well as uneven distribution of rainfall pattern. Rainfed cotton requires 700 to 800 mm of well distributed rainfall. In Maharashtra nearly 80-85 % of total annual rainfall (750-1100 mm) is received till flowering stage and shortage of water occurs during boll development stage leading to lesser yields.

Drip irrigation method potentially improves water and fertilizer use efficiency. Cotton uses water during its growing period through the dual procedures of evaporation and transpiration, commonly referred to as ET. Many of the irrigation scheduling experiments consider reference ET and crop co-efficients for ETc calculation. One of the most important advances needed for irrigation management is the ability to more accurately assess spatial and temporal patterns of crop evapotranspiration (ETc) so that irrigation schedules can be appropriately matched to actual crop water needs on a field-by-field basis. The remote sensing approach that considers canopy reflectance and surface temperatures, along with ground-based meteorological data, gives better estimate of ETc.

Considering the above facts in view, field trials were conducted to study the effect of remotely sensed ET based drip irrigation. Field experiment was conducted at ICAR-CICR, Nagpur in a randomized block design with the following six treatments: 1) Drip irrigation @ 100% ETc at two irrigations per week 2) Drip irrigation @ 100% ETc at one irrigation per week 3) Drip irrigation @ 75 % ETc two irrigations per week 4) Rainfed 5) Flood irrigation, 2 Irrigations with 200 mm depth, first in October (3rd week) and second in the November (1st week).

Mallika BG-II hybrid was sown in the second fortnight of June at a spacing of 1.25 x 0.45 m. Recommended fertilizer dose of 150:75:75 N P₂O₅, K₂O kg/ha was applied. The one-third dose of the nitrogen and entire phosphorus and potassium fertilizer dose was applied as basal dose and one-third of nitrogen was applied at 30 DAS (days after sowing) as a band placement method. Then, the remaining one-third fertilizer was applied at 105 DAS at boll development stage.

Irrigation: Irrigation was scheduled when the soil moisture content dropped to wilting point. In all the treatments irrigation was started from second fortnight of October to second fortnight of December with differential quantity of irrigation at weekly interval. The PET under rainfed conditions is 572 mm. Over and above PET, the amount of irrigation given to each treatment during the entire cropping season is provided in the Fig 1.

Seed cotton yield: The total seed cotton yield (fig 2.) was maximum when cotton was irrigated at 100% ETc twice a week (2676 kg/ha) followed by 75 % ETc twice a week (2407 kg/ha) and 100% ETc once (2351 kg/ha). Whereas in case of furrow irrigation and rainfed treatments the seed cotton yield was 2040 kg/ha and 1968 kg/ha, respectively. The seed cotton yield reduction in flood and rainfed treatments is 23.7% and 26.4% respectively compared to 100% ETc twice a week. The results revealed that during boll development stage the boll size was better with more frequent irrigations. This ultimately resulted in higher seed cotton yield. Under rainfed conditions the adverse effects of rainfall pattern can certainly be reduced by providing supplemental irrigations with drip and also with the adoption of moisture conservation techniques like ridge and furrow system and live mulch.

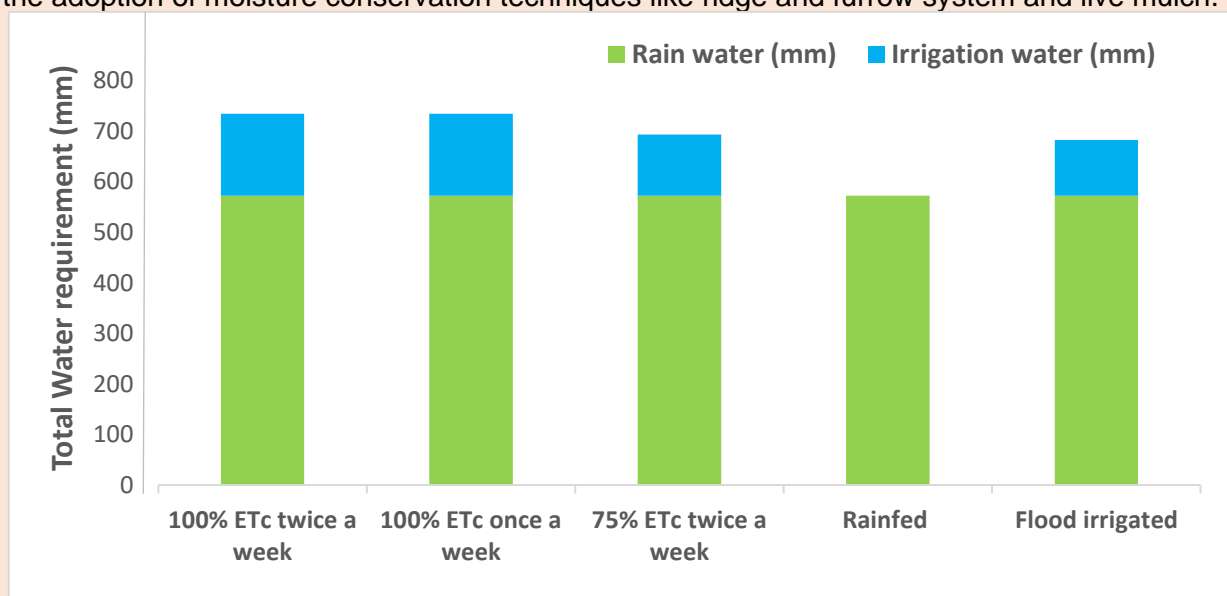


Fig 1. Water requirement (mm) of Bt hybrid cotton under various irrigation scheduling treatments

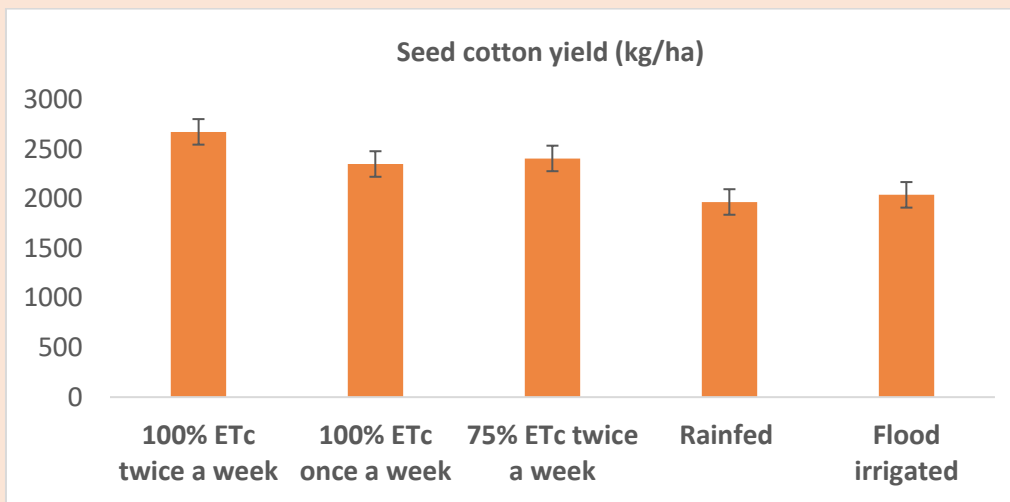


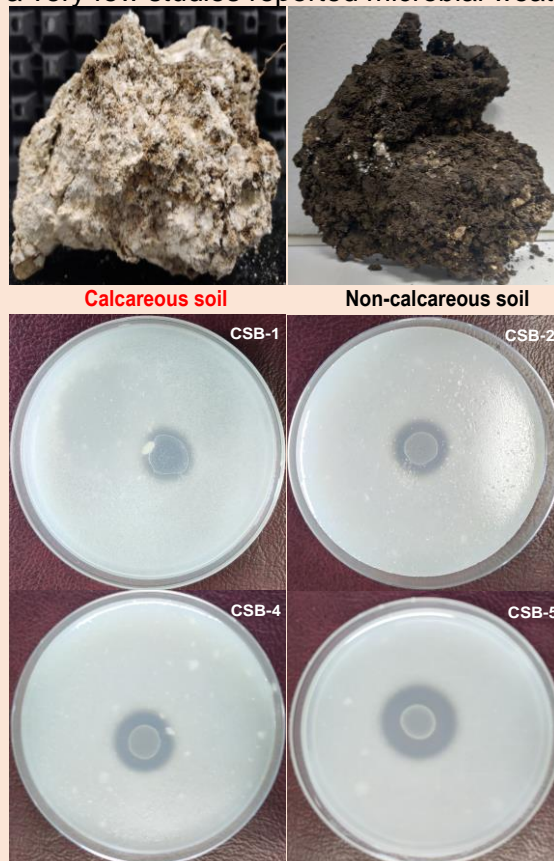
Fig 2. Seed cotton yield of Bt hybrid under various irrigation scheduling treatments

Research Communication

Microbial dissolution of calcium carbonate: A novel ecofriendly approach to ease soil sodicity **K. Velmourougane, A. Manikandan, D. Blaise**

Crop Production Division, ICAR-Central Institute for Cotton Research, Nagpur

Calcium carbonate is a common mineral in soils from dry (sub-humid to arid) regions worldwide. Any soil with CaCO_3 content greater than 4% can be described as a calcareous soil. The estimated area of calcareous soils is 229×10^6 hectares, which covers 69.4% of the total geographical area of the country. Calcareousness of soils is caused by the presence of both pedogenic and non-pedogenic CaCO_3 , but the pedogenic formation of CaCO_3 is unfavourable as it induces soil sodicity, which impairs the hydraulic properties of the soils and reduces the crop productivity and acts as a precursor for soil degradation in the semi-arid tropics. Problems with pedogenic CaCO_3 include, poor drainage, low infiltration rate, waterlogging, sodicity, nutrient deficiency, low organic carbon availability, low soil and crop productivity, soil degradation. There is an urgent need for the reclamation of calcareous soils, as it affects soil physical and chemical properties, apart from affecting root penetration. The application of gypsum to sodic soils will provide calcium to displace sodium. However, one still needs rainfall or irrigation to leach the displaced sodium. Further, Gypsum itself is a salt and repeated application may affect the soil. Though ample literature is available on the microbial formation of CaCO_3 , a very few studies reported microbial weathering of soil calcium carbonate



This study aimed to isolate calcium solubilizing bacteria (CSB), and to develop consortia of CSB for the dissolution of pedogenic CaCO₃ in calcareous soils through exogenous application to ensue improved soil and cotton productivity. We have evaluated four CSB isolates (CSB1, CSB2, CSB4, and CSB5) and their consortia (CSB-C) for the dissolution of pedogenic CaCO₃. Pot culture experiments in triplicate with four main treatments (non-calcareous, 5%, 10%, and 20% calcareous soils) and six sub-plot treatments (100% recommended dose of fertilizers (RDF), 75% RDF + CSB1, CSB2, CSB4, CSB5, and their consortia (CSB-C)) were conducted with Ankur 3208 BGII. CSBs (10⁸–10⁹ cfu ml⁻¹) were inoculated @ 5 mL kg⁻¹. All plant and soil parameters were significantly affected by the increasing levels of CaCO₃. However, inoculation of CSB as consortia (CSB-C) found to alleviate CaCO₃ stress and enhance all the plant parameters compared to uninoculated control (RDF). Overall, CSB-C enhanced plant parameters compared with individual CSB isolates. In root attributes, inoculation of CSB-C enhanced root length by 16.5%, root girth (22%), root density (23%), root surface area (10.5%), root biomass (22%), secondary root numbers (19%), and root:shoot ratio (14.6%) compared to RDF. In shoot attributes, CSB-C enhanced shoot length, shoot girth, and shoot biomass by 2%, 5%, and 10.5%, respectively. In yield contributing parameters, CSB-C enhanced sympodia, boll numbers, boll weight, and seed cotton yield/plant by 17.5%, 59%, 14.8%, and 46%, respectively. Application of CSB-C as seed treatment was found to improve soil macro and micronutrient availability even at higher levels of free CaCO₃. A 4% reduction in soil pH, 13% increase in OC, 10% increase in N, 25% increase in P, 44% increase in K, 23% reduction in total CaCO₃, 16% increase in Zn, 11% increase in Cu, 30% increase in Mn, and 7% increase in Fe were recorded in treatment inoculated with CSB-C compared to RDF. Application of CSB-C was also found to enhance innate plant defense enzymes (catalase, peroxidase, polyphenol oxidase, phenyl ammonia lyase, and phenols) involved in stress tolerance, apart from solubilizing and mobilizing other micronutrients such as Magnesium and Zinc. From our study, it is evident that the use of CSB formulation provides greater beneficial effects on plant and soil health. Therefore, CSB formulation can be recommended as promising bio-inoculants to improve cotton productivity in soil affected by calcareousness and sodicity. Based on the promising results, presently the CSB formulation is currently being tested in farmer fields in Purna valley, Amravati district, Maharashtra for its effectiveness in enhancing cotton productivity cultivated under high Pedogenic CaCO₃ content.

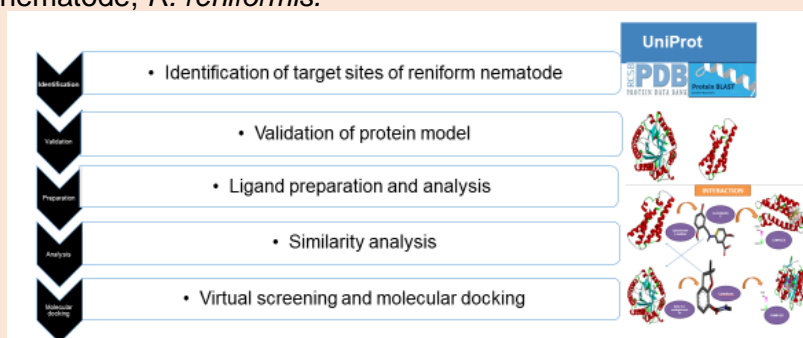
Research Notes Clipping

Levundustin C, - A novel nematocidal biomolecule opens new vistas for the management of cotton reniform nematode, *Rotylenchulus reniformis*

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Reniform nematode, *Rotylenchulus reniformis* is an important nematode pest of cotton causing an annual yield loss of up to 10 %, which is being managed mainly through the application of chemical nematicides. Owing to increased awareness about the harmful effect on human beings, environment, and due to the withdrawal of some of the nematicides from the market, increased attention is being paid to the use of biocontrol agents. Several fungal and bacteria biocontrol agents are being used for the management of nematodes in agricultural and horticultural crops. Among them, *Pochonia chlamydosporia* is being widely used as a potential bionematicide. A native isolate of *P. chlamydosporia* produces a biomolecule Levundustin C in liquid state fermentation. Molecular modelling and docking studies were carried out through Auto Dock Vina module in PyRx 0.8 software to understand the binding affinity of the ligand Levundustin C from *P. chlamydosporia* against the protein targets, b-1,4 –endoglucanase and Cytochrome c oxidase polypeptide I of *R. reniformis*. Results emphasized that, Lavendustin-C had the maximum binding affinity for Cytochrome c oxidase polypeptide I (- 5.0 kcal/mol) and 1,4-endoglucanase (- 4.1 kcal/mol), compared to the nematicide carbofuran 3G, which had the binding energy of -3.6 kcal/mol and - 4.8 kcal/mol for the target proteins 1,4-endoglucanase and Cytochrome c oxidase polypeptide I respectively. Thus, the novel biomolecule Lavendustin-C of *P. chlamydosporia* origin could be explored as a potential nematicide for the management of reniform nematode, *R. reniformis*.

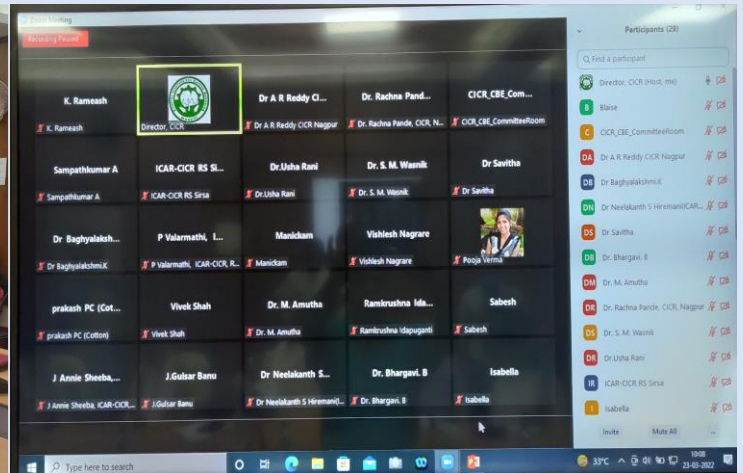


Annual Institute Research Committee (IRC) Meeting – 2022

The Annual Institute Research Committee (IRC) - 2022 meeting of ICAR-CICR was conducted as a combined IRC for ICAR-CICR, Nagpur, ICAR-CICR, RS, Coimbatore, and ICAR-ICAR, RS, Sirsa from 15–17, 22–26 March, and 18–April 19, 2022, at ICAR-CICR, Nagpur in both physical and virtual mode. Dr. Y.G. Prasad, Director and Chairman, IRC chaired the meetings. All the Heads of Divisions, Heads of Regional Stations, Head, PME Cell, Secretary, IRC, and all the Scientists of ICAR-CICR participated in the deliberations. Director presented the details of EFC 2021–26 under the five major research programs. He also presented the RAC action points, action points from DDG, CS review.

The Director also discussed the progress of technology park initiation, status of collaborating institutes, MOU proposals, new research proposals, notable initiatives from the institute, workshop, interface meetings, publications, etc. Dr. K. Velmourougane, Secretary, IRC, presented the Action Taken Report (ATR) of the previous IRC (2021), and the IRC confirmed the ATR of the last IRC meeting. In the IRC-2022, 24 projects were approved for closure on completion and 24 new projects were approved. After the project matrix finalization, 83 projects (67 institute and 16 externally funded projects) are listed as ongoing projects.

During the IRC 2022, Dr. OM. Bambawale (Member, RAC), Dr. M. Nagesh (Director, NBAIR), and Dr. Rabi Narayan Sahoo (Project leader NePPA project) visited ICAR-CICR, took part in some of the deliberations, and offered their ideas and suggestions. The IRC felicitated Dr. S.M. Wasnik (Principal Scientist, Agricultural Extension) and Dr. Suman Bala Singh, Principal Scientist (Plant Breeding), who were due for their superannuation in April 2022. Dr. Wasnik and Dr. Suman Bala Singh presented their lifetime achievements in cotton research in the IRC-2022. Dr. K. Velmourougane, Secretary IRC and Dr. Chinnababu Naik, Joint Secretary IRC coordinated the meeting.



Training programme on crop residue management for staff and farmers of WWF, India at ICAR-CICR, Nagpur

A one day training programme on “Crop Residue Management” was organized in association with World Wide Fund for Nature, India (WWF India) at Division of Crop Production, ICAR-Central Institute for Cotton Research (CICR), Nagpur on 29th March 2022. Farmers and field staff who are working with WWF India participated in this programme from Chindwara and Nagpur districts. These field staff and farmers are mainly involved in “Organic cotton cultivation” to restore soil health and fertility. The main focus of the training was to demonstrate different crop residue management techniques for improving organic carbon content in soil for promoting organic cotton cultivation. The training started with formal inaugural and welcome address by Mrs. Rachana Deshmukh (Technical Officer), followed by formal introduction of the trainees. The opening remark about the training programme was given by Dr. Blaise Desouza (Head, Division of Crop Production, ICAR-CICR). He emphasized on the importance of in-situ and ex-situ crop residue management, long-term organic cultivation practices in maintaining and restoring soil fertility and soil health. He encouraged the farmers to do the testing of soil samples for better understanding of soil nutrient and fertility status. Dr. Prateeksha Mehra (Senior Project Officer, WWF India) provided an overview on the activities of WWF, India. She also briefed about regenerative agriculture (RA) pilot project in cotton-growing regions of Chindwara district, Madhya Pradesh. Dr. Y. G. Prasad, Director, ICAR-CICR in his concluding remarks highlighted the importance of organic cotton in the present scenario and increasing global demand for the same. He advised master trainees to extend/share the knowledge and benefits of this training to 6000 organic cotton cultivating farmers in their villages. The importance of the regenerative agriculture (RA) pilot project in cotton growing areas and its collaboration with ICAR-CICR, was appreciated by Director. The inaugural programme was followed by the lectures and practical demonstration. Dr. Blaise Desouza delivered a lecture on “Restoring Soil Health - Best Management Practices”. The importance of practices like crop rotation, intercropping, live mulching, newspaper mulching, soil test based fertilizer recommendations were highlighted. Dr. A Manikandan, (Scientist, Soil Science), delivered a lecture on “Recycling of crop residues and their benefits - on-farm”. The practical demonstration included vermicomposting, vemiwash and biochar preparation. Dr. Savitha Santosh (Scientist, Agricultural Microbiology) delivered a lecture on “Improving crop residues quality”. This was followed by practical demonstration on preparation of compost. This was followed by field demonstration of cotton stalk shredder and mulching on farm by Mrs. Rachna Deshmukh (Technical Officer, Soil Science) and Mr. Chandrashekar Mundafale (Technician, Soil Science). The training participation certificate and information brochure on training contents were distributed to the trainees. Dr. A. Manikandan and Dr. Savitha Santosh coordinated the training programme.



Training cum demonstration of Cotton Stalk Shredder

One day training cum demonstration programme of Cotton Stalk Shredder was organized in ICAR-CICR Nagpur on 02nd March, 2022. Dr S. M. Wasnik, Dr Nandini Gokte Narkhedkar and Dr Y G Prasad highlighted the importance of Cotton Stalk Shredder.



Memorandum of Understanding: ICAR- Central Institute for Cotton research, Nagpur and World Wide Fund for Nature – India signed memorandum of understanding (MOU) for availing technical services of soil testing for three years (2022-2024) towards Regenerative Agriculture fields of organic cotton and forest ecosystem of Chindwara District, Madya Pradesh.

Visit of Vice Chairman- AP Agriculture Mission –ICAR- CICR, Regional Station, Coimbatore

Sri M.V.S Nagi Reddy, Hon'ble Vice Chairman, Andhra Pradesh State Agriculture Mission visited CICR, Regional Station, Coimbatore on 11 March, 2022. During the visit he interacted with the all the scientists of the station. The Director joined the meeting virtually and discussed regarding the cotton cultivation in Andhra Pradesh during this season. Project Coordinator and Head Dr. AH Prakash, briefed on the research achievements of the station. He also visited the polyhouses and demonstration fields of poly-mulch and drip fertigation.



Students' visit to ICAR-CICR, Regional Station, Coimbatore

Twenty Eight UG Botany and Biotechnology students from National College, Manacaud, Trivandrum visited ICAR-CICR, Regional Station on 22 March, 2022. Dr A. Manivannan (Genetics and Plant Breeding) interacted with students and highlighted the ongoing research activities related to Biotechnology in the Station. Field and laboratory visits were also arranged during the visit.



“Interface Meeting on Enhancing Cotton Productivity in North Zone: Way Forward” held at ICAR-CICR Regional Station, Sirsa

“Interface Meeting on Enhancing Cotton Productivity in North Zone: Way Forward” was organized in hybrid mode at ICAR-Central Research Institute for Cotton Research, Regional Station, Sirsa, Haryana on March 30, 2022 on the occasion of “Azadi Ka Amrit Mahotsav” under the Chairmanship of Dr. B. R. Kamboj, Hon'ble Vice Chancellor, CCS HAU, Hissar, Haryana.

Dr. S. K. Verma, Head, ICAR-CICR Regional Station, Sirsa, Haryana welcomed the chief guest of the meeting Dr. B. R. Kamboj, Hon'ble Vice Chancellor, CCS HAU, Hissar, Haryana; Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. A. H. Prakash, Project Coordinator and Head, ICAR-CICR, Coimbatore, Dr. P.S. Shekhawat, Director of Research, SKRAU, Bikaner; other dignitaries and participants from various stake holders like SAUs, State Agriculture Departments, ICAR institutes, private seed companies, seed and fertilizer dealers, representatives from cotton ginning mills and progressive farmers of the North Zone, Dr. Rishi Kumar, Principal Scientist (Entomology), Dr. S. K. Sain, Principal Scientist (Plant Pathology), Dr. Amarpreet Singh, Scientist (Agronomy) and Dr. Debashis Paul, Scientist (Seed Technology) from ICAR-CICR, Regional Station, Sirsa also participated and delivered lectures in the meeting.

A total of 25 participants in person and 85 participants online joined the meeting from various stakeholders.



Activities by ICAR-CICR under different schemes (Tribal Sub-Plan, SCSP, IRM, etc.)

The programme organized under different schemes during the month of March 2022 is as follows.

Sr. No.	Programme	Date	Place	Participants	Conducted by	Under the scheme
1.	Farmer's training-cum-input distribution program to the tribal farmers. Distribution of 100 Summer moong seeds bags and Trichoderma (CICR-Tricho-CASH).	March 3, 2022	KVK, Sonapur, Gadchiroli (M.S.)	100 farmers	Co-ordinators: Dr. V. Chinna Babu Naik Dr. Dipak T. Nagrale	TSP

During these programmes, experts from ICAR-CICR have interacted with the farmers and advised them about the schemes, integrated management of pink bollworm and sucking pests, boll rot disease complex, Management of foliar diseases, installation of pheromone traps for pest monitoring and mass trapping etc



Did You Know?

New wearable device for plants: on-site monitoring of water loss

On-site and non-destructive quantification of cellular water content of plants is desirable to assess the loss of water content from plants and so to assess the plant health. The research team tried different electrodes one made of nickel deposited in parallel tilde pattern, and the other cut from partially burnt paper coated with a waxy layer of film. Both the electrodes were fixed to detached leaves with clear adhesive tape. The nickel-based electrodes performed better, producing larger signals as the leaves dried out. The freestanding design of the Ni electrodes was able to deliver high on-leaf adhesion (under the action of wind velocities) and long-term compatibility. These devices wirelessly share the data to a smartphone app and website, which in turn is converted to the percent of water content lost with a machine learning technique. Hence, the application of this wearable tool to potentially save the resources, to increase yield and to provide information on exposure to pests may be explored in cotton.

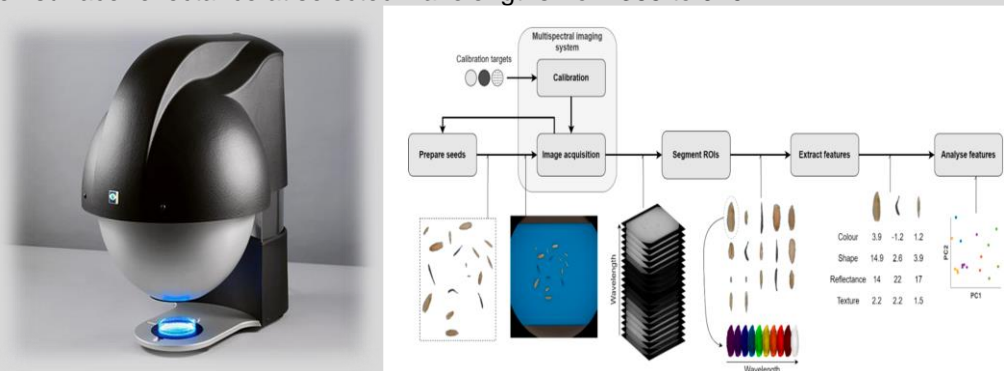
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Contributed by: Pooja Verma, Scientist, Plant Biochemistry, ICAR-CICR, Nagpur

Recent Advances in Seed Science and Technology

The Use of Multispectral Imaging (MSI) in Seed Testing and Research

Multispectral imaging of seeds is a non-destructive technique for simultaneously measuring spectral and spatial information of seeds by imaging their surface reflectance at selected wavelengths from 365 to 970 nm.



Some of the recent applications of Multispectral Imaging are as follows

Varietal Identity and Purity:

Multispectral imaging has been employed for varietal discrimination and identification in several species such as tomato (*Solanum lycopersicum* L.), rice (*Oryza sativa* L.) and soybean. Colour, shape and spectral features have been used in the classification models (Yang *et al.*, 2020).

Insect Infestation : Insect infestation occurring in the later developmental phase may not be identified and has the potential to damage the seed during storage. X-ray and MSI have been successfully tested for the identification of grain moth (*Sitotroga cerealella*) in Wheat (França-Silva *et al.*, 2020).

Mechanical Damage:

MSI can detect changes in surface color and reflectance during maturation in sugar beet seed and the study verified a concomitant increase in the content of phenolic compounds also (Chomontowski *et al.*, 2020).

Seed Viability: Olesen *et al* (2015) identified viable castor bean (*Ricinus communis* L.) seeds with 92% accuracy and showed good correlation between results from Tetrazolium tests and Multi Spectral Imaging system.

Seed Vigour: Hu *et al* (2020) examined seeds of six species within the *Fabaceae* family with MSI for the detection of hard seeds.

Seed Health: Multispectral imaging for seed health detection has in several studies been based on artificial inoculation of uninfected seeds, with freeze-blotter seed health assay as reference method. In spinach detection of *Stemphylium botryosum*, *Cladosporium* sp. *Fusarium* sp and recently detection of *Aspergillus* in Cowpea through MSI were reported (Rego *et al.*, 2020).

In near future a relevant application for MSI is the characterization for the preservation of plant genetics resources may also be done. For this application phenotyping of the germplasm lines such as shape, texture, reflectance, and colour are highly relevant and they may be combined with a focus on specific parts of the seed also, for example, the morphology of the hilum region of seed, Surface texture of the seed etc.

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Contributed by Dr. Debashis Paul, Scientist, Seed Science and Technology, CICR, RS, Sirsa

Farmer's Corner

Doubling Farmer's Income: Shri. Munigela Suresh from Burnoor Village of Adilabad district shares his success story

Shri. **Munigela Suresh**, resident of **Burnoor** Village, **Adilabad** Mandal and Adilabad District is associated with farming for last 25 years. He owns 10 acres of land under rainfed conditions and witnessed reduction in the production of BT cotton due to infestation of aphids, leafhopper, whitefly and thrips and pink bollworm since last 4 to 5 years. During 2020-21, he cultivated cotton in 5 acre area of land but due to the heavy infestation of sucking pests and pink bollworm he incurred 50 % of crop loss. Because of the increase in cost of cultivation and low profitability the net income earned by him was very low. During 2021-22, he cultivated cotton crop in the same area with technical guidance and motivation from Scientists of ARS, Adilabad and local agricultural department officials. Also he got the opportunity to participate in the Cotton Front Line Demonstrations (FLDs) – Integrated Crop Management (ICM) component under the guidance of Agricultural Research Station (ARS), Adilabad and Prof. Jayshankar, Telangana State Agricultural University, Telangana. Under this component, ARS staff regularly provided technical guidance during the entire season, trained the farmers for monitoring of pests using yellow sticky traps and pheromone traps and effective management of different pests. The farmer followed the different pest management strategies such as seed treatment with insecticides, installation of yellow sticky traps, pheromone traps, spraying of Azadirachtin at flower initiation, plucking of rosette flowers, use of *Tricho* cards and ETL based spraying of label claim compatible pesticides. By effectively managing the sucking pests and pink bollworm, he obtained 2300 kg/ ha seed cotton yield with B.C ratio of 1: 2.1 compare to 1750 kg/ha yield and 1: 1.75 B: C ratio in check plot.



Input distribution - Yellow sticky traps, Pheromone traps, Azadirachtin insecticide and need based insecticides to FLD farmer



Pheromone traps (PBW) installation at FLD farmer field



ARS, Adilabad scientists interaction with FLD farmer

Information provided by
Dr. V.Chinna Babu Naik,
Senior Scientist, ICAR-CICR, Nagpur.

Scientists' Corner:

- Dr. Y.G Prasad, Director, ICAR-CICR inaugurated newly constructed Bullock House in Farm Section Bullock Shade, ICAR-CICR, Nagpur on 01st March, 2022.
- Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head (I/C), Dr. Rishi Kumar, Principal Scientist (Entomology) participated in a workshop and presented the Pink Boll Worm (PBW) management strategies during off season and in season at CCS HAU Hisar on March 02, 2022
- One day Farmers' training cum input distribution programme was organized in KVK Sonapur, Gadchiroli under TSP on 03rd March, 2022. The training started with welcome address by Mr Dnyaneshwar Thatod, SMS, KVK, Sonapur, Gadchiroli. Dr C D Mayee, Former Chairman, ASRB, and Dr Y G Prasad, Director, ICAR-CICR Nagpur chaired the programme
- Dr. V. Chinna Babu Naik, Sr. Scientist (Ag. Entomology), Dr. T. Prabhulinga, Scientist (Ag. Entomology) and Dr. Dipak T. Nagrale, Sr. Scientist (Plant Pathology) delivered an interactive lecture on "Management of Pink bollworm in Cotton", "Management of sucking pest complex in cotton" and "Integrated boll rot disease complex management in cotton" respectively to the tribal farmers in one-day "Farmer's training-cum input distribution program" under TSP scheme organized by ICAR-CICR, Nagpur on dated 3rd March, 2022.
- Dr. Y. G. Prasad, Director, ICAR-CICR and Dr. V. N. Waghmare, Acting Head, Crop Improvement Division, ICAR-CICR attended the Expert Committee Meeting of the NASF of the strategic area "Biotechnology genomics and allele mining in plants, animals and fisheries" on 07th and 08th March, 2022 organized by Dr D. K. Yadava (ADG,NASF) through video conferencing.
- Dr. Y. G. Prasad, Director, ICAR-CICR and Senior Finance & Accounts Officer, ICAR-CICR attended ICAR/DARE Senior Officers' Committee (SOC) Meeting for discussion on budget utilization and related issues on 07th March, 2022 through video conferencing.
- Dr. Amarpreet Singh, Scientist (Agronomy) from ICAR-CICR, Regional Station, Sirsa participated in the Meeting regarding the 'Recommendation of DLTC for fixation of scale of finance' at DC Office, Mini Secretariat, Sirsa on March 07, 2022.
- As a part of the Celebration of 75th Anniversary of Indian Independence (Azadi ka Amrit Mahotsav), ICAR-CICR & KVK, Nagpur celebrated International Women's Day on 8th March 2022 at ICAR-CICR Nagpur. Dr. Sunil Rokde, Head KVK, ICAR-CICR, Nagpur conducted the programme.



- Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa attended a NASF-Project meeting on March 08, 2022 through online mode organized by The Expert Committee Meeting for the strategic area, "Biotechnology, genomics and allele mining in plants, animals and fisheries" of the National Agricultural Science Fund (NASF), ICAR.
- Dr. Rishi Kumar, Principal Scientist (Entomology) delivered lecture on "Insecticides Induced Resurgence in insects, its mechanisms and management" in the Department of Entomology, Punjab Agricultural University Ludhiana to on March 11, 2022.
- Dr. S. K. Sain, Principal Scientist (Plant Pathology), Dr. Amarpreet Singh, Scientist (Agronomy) from ICAR-CICR, Regional Station, Sirsa participated and delivered lecture in the District Level Kisan Mela & Exhibition at Anaj Mandi, Bhattu Kalan, Fatehabad on March 12, 2022. A total of 500 farmers actively participated in that Programme.
- Dr. Y. G. Prasad, Director, ICAR-CICR and Senior Finance & Accounts Officer, ICAR-CICR attended the meeting for discussion on 100 % budget utilization and related issues on March 16, 2022 through video conferencing organized by Director (Finance), ICAR, New Delhi.
- Dr. Y.G. Prasad, Director and Chairman, IRC, chaired the Annual Institute Research Committee (IRC) - 2022 meetings of ICAR-CICR being conducted as a combined IRC for ICAR-CICR, Nagpur, ICAR-CICR, RS, Coimbatore and ICAR-ICAR, RS, Sirsa from 15-26th March, 2022. All the Heads of Divisions, Heads of Regional Stations, Head, PME Cell, Secretary, IRC and all the Scientists of ICAR-CICR participated in the deliberations.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur chaired the programme on World Water Day at KVK, ICAR-CICR, Nagpur on the theme of "Groundwater, making the invisible visible" on 22nd March, 2022. On this occasion about hundred participants including farmers, SHG women and scientists of CICR and KVK staff participated in the programme.

- Dr. Y. G. Prasad, Director, ICAR-CICR and Dr. M.V. Venugopalan attended the meeting of committee on Cotton Production and Consumption on 22nd March 2022 through video conferencing organized by Cotton Section, Office of the Textile Commissioner (Mumbai).
- Dr. Dipak T. Nagrale, Sr. Scientist (Plant Pathology) gave virtual oral presentation on “Identification and characterization of emerging bacterial boll rot of cotton in central India” dated 24th March, 2022 in the Session “2A. Taxonomy and systematics of plant pathogens” at IPS 8th International Conference (hybrid mode) on “Plant Pathology: Retrospect and Prospects” organized at Sri Karan Narendra Agriculture University, Jobner-Jaipur, Rajasthan, India held during March 23-26, 2022.
- Dr. S. K. Sain, Principal Scientist (Plant Pathology) participated and presented the oral paper on ‘*Surveillance on target spot of cotton caused by Corynespora cassiicola and its variability study: An emerging disease of cotton in India.*’ in the 8th International Conference Plant Pathology: Retrospect & Prospects (Hybrid Mode) organized by Indian Phytopathology Society, New Delhi during March 23-26, 2022, Jobner, Jaipur. The paper received Best Oral Paper Presentation Award.
- Dr. Y. G. Prasad, Director, ICAR-CICR participated as guest of honour in the National Seminar on Managing Soils in a Changing Climate on 24-26th March, 2022 organized by ISSLUP in association with ICAR- NBSS & LUP Nagpur.
- Dr. A. Manikandan delivered a talk on “Soil testing: A diagnosis of nutrients for crop production” in a National Conference on Innovative Technologies in Agriculture organized at Priyadarshini Bhagwati College of Engineering, Nagpur, during March 24-25, 2022.
- Dr. Angamuthu Manikandan attended and made a poster presentation on “Sorption of Sulfur Formulations on Cotton Growing Soils” in a National Seminar on Managing Soils in a changing climate held at ICAR-NBSS&LUP, Nagpur during March 24-26, 2022.
- Dr. Pooja Verma attended and made an oral presentation on “Seed bio-priming with endophytes enhances antioxidative defense system in host and non-host crops” in the 8th IPS international conference (Hybrid mode) on Plant Pathology: Retrospect and Prospects at Jobner-Jaipur, Rajasthan held during March 23-26, 2022.
- ICAR- CICR, Nagpur Official language Implementation Committee meeting was held on 26 th March 2022. Dr. Y. G. Prasad, Director, CICR, Nagpur, presided over the meeting. Various issues related to the official language were discussed during the Committee.
- Dr. Y. G. Prasad, Director, ICAR-CICR participated in the 93rd Annual General Meeting (AGM) of ICAR Society on 26th March 2022 through video conferencing.
- One day Workshop on Cotton Production Technology was organised by ICAR-CICR, RS, Sirsa on 28th March, 2022. The workshop started with welcome address by Sh. Rakesh Jhorar, FPO. Dr. Y. G. Prasad, Director, ICAR-CICR attended programme as a Chief Guest.
- Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head (I/C), Dr. Rishi Kumar, Principal Scientist (Entomology), Dr. S. K. Sain, Principal Scientist (Plant Pathology), Dr. Amarpreet Singh, Scientist (Agronomy) and Dr. Debashis Paul, Scientist (Seed Technology) from ICAR-CICR, Regional Station, Sirsa attended and delivered lectures in “A workshop on Cotton Production Technology” on March 28, 2022 organized by Farmers Product Organisation, Bani, Sirsa. A total of 70 farmers participated in this Program.
- Second meeting of the Institute Joint Staff Council (IJSC) was held on on 29th March 2022 at ICAR-CICR, Nagpur. All the members of the IJSC joined the meeting along with Director, ICAR-CICR, Nagpur.
- Dr. Y. G. Prasad, Director, ICAR-CICR and Senior Finance & Accounts Officer, ICAR-CICR attended the meeting for discussion regarding Budget & Expenditure Review on 29th March, 2022 through video conferencing.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Shri. Atul Sharma, Secretary, Gram Sewa Mandal, Gopuri, Shri Kishor Jagtap from Mission Samridhi, Shri Mahendra Fate of Bajaj Foundation, a representative of FPO from Wardha, and Heads of Divisions, ICAR-CICR, Nagpur participated in the meeting regarding the promotion on non-GM cotton varieties for organic cotton production in the districts of Wardha and Yavatmal in collaboration with Gram Sewa Manadal, Wardha and Mission Samridhi, Chennai on 30th March, 2022 in the Institute.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. A. H. Prakash, Project Coordinator and Head, ICAR-CICR, Regional Station, Coimbatore, Dr. P.S. Shekhawat, Director of Research, SKRAU, Bikaner; other dignitaries and participants from various stake holders like SAUs, State Agriculture Departments, ICAR institutes, private seed companies, Seed cum Fertilizer and Pesticide Dealers, Representatives from Cotton ginning oil extraction mills and progressive farmers of the North Zone participated in the Interface Meeting on Enhancing Cotton Productivity in North Zone organized at ICAR-Central Research Institute for Cotton Research, Regional Station, Sirsa, Haryana on 30th March, 2022 on the occasion of “Azadi Ka Amrit Mahotsav” under the Chairmanship of Dr. B. R. Kamboj, Hon’ble Vice Chancellor, CCS HAU, Hisar, Haryana.

Publications

- Savitha Santosh., Velmourougane, K., Idapuganti, R.G., Manikandan, A., Blaise, D (2022). Potassium Solubilizing Potential of Native Bacterial Isolates from Cotton Rhizosphere of Rainfed Vertisols. *National Academy Science Letters*. <https://doi.org/10.1007/s40009-022-01113-x>.
- Angamuthu Manikandan, Desouza Blaise, Rachana Deshmukh, and Chandrashekhar Mundafale. 2022. Sorption of Sulfur Formulations on Cotton Growing Soils. *National Seminar on Managing Soils in a changing climate*. ICAR-NBSS&LUP, Nagpur. 24-26 March, 2022. Page No. 17
- Manikandan, D. Blaise, and Y. G. Prasad. 2022. Soil testing: A diagnosis of nutrients for crop production. National Conference on Innovative Technologies in Agriculture. Priyadarshini Bhagwati College of Engineering, Nagpur. 24-25 March 2022. Page No. 16-17.

Cotton scenario during March 2021

A. R.Reddy and Isabella Agarwal

Committee on Cotton Production and Consumption (COCPC) in its meeting held on 22.03.2022 revised the figures of state wise area, production and productivity of cotton in India. As per the revised estimates cotton area during 2020-21 was 132.85 lakh ha while the production was 352.48 lakh bales. Similarly, cotton area during 2021-22 is estimated at 123.50 lakh ha while the production is estimated at 340.62 lakh bales.

Table 1: Revised estimates of area, production and productivity of cotton in India

Name of the state	2020-21			2021-22		
	Area	Production	Yield	Area	Production	Yield
Punjab	2.52	10.23	690	3.04	11.66	652
Haryana	7.40	18.23	419	6.48	18.94	497
Rajasthan	8.07	32.07	676	7.56	24.36	548
NORTHERN ZONE	17.99	60.53	572	17.08	54.96	547
Gujarat	22.70	72.18	541	22.55	85.16	642
Maharashtra	45.44	101.05	378	41.82	75.28	306
Madhya Pradesh	5.88	13.38	387	5.90	14.92	430
CENTRAL ZONE	74.02	186.61	429	70.27	175.36	424
Telangana	23.58	57.97	418	20.51	65.87	546
Andhra Pradesh	6.06	16.00	449	5.36	16.24	515
Karnataka	8.20	23.20	481	6.91	18.33	451
Tamilnadu	1.12	2.43	369	1.25	2.96	403
SOUTHERN ZONE	38.96	99.60	435	34.03	103.40	517
Orissa	1.71	5.51	548	1.93	6.59	580
Others	0.17	0.23	--	0.19	0.31	--
TOTAL	132.85	352.48	451	123.50	340.62	469

Area in Lakh hectares, Production in lakh bales of 170 kgs each, Yield in Kilogram / Hectare

Source: Office of the textiles commissioner, Gol, (<http://www.txcindia.gov.in/>)

Cotton balance sheet

The Committee also revised the cotton balance sheet in the same meeting. As per the revised estimates, total supply of cotton during 2020-21 was 484.30 lakh bales which include crop receipts of 352.48 lakh bales, imports of 11.03 lakh bales and opening stock of 120.79 lakh bales. Similarly, total demand for the year 2020-21 was 412.46 lakh bales which include mill consumption of 297.45 lakh bales and exports of 77.59 lakh bales. Closing stock for the year 2020-21 was estimated at 71.84 lakh bales. Total cotton supply for the year 2021-22 was estimated at 430.5 lakh bales while the demand was 385.00 lakh bales. The estimated crop size for the year 2021-22 was 340.62 lakh bales while the mill consumption was 305.00 lakh bales. Similarly imports and exports for the year 2020-21 was to be 18.00 lakh bales and 40.00 lakh bales respectively.

Table 2. Cotton balance sheet during 2019-20 and 2020-21

(In lakh bales of 170 kg. Each)

Particulars	2020-2021	2021-22
SUPPLY		
Opening Stock	120.79	71.84
Crop	352.48	340.62
Import	11.03	18.00
TOTAL SUPPLY	484.30	430.46
DEMAND		
Mill Consumption	297.45	305.00
S.S.I Consumption	22.42	24.00
Non Textile Consumption	15.00	16.00
Export	77.59	40.00
TOTAL DEMAND	412.46	385.00
Closing Stock.	71.84	45.46

Source: Office of the textiles commissioner, Gol, (<http://www.txcindia.gov.in/>)

Click of the Month



Stem weevil of cotton

**Contributed by,
Dr. K. Rameash,
Principal Scientist, ICAR-CICR-RS, Coimbatore**



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