COTTON INNOVATE

Cotton Innovate

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

(Photo: Dr G I Ramakrushna)

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Invited Research note

Microbial biofilms: An eco-friendly agri-input to enhance soil and cotton productivity

K. Velmourougane, Savitha Santosh, Rachna Pande, Dipak Nagrale, P. Nalayini, A. Manikandan, D. Blaise

In the context of increasing food demand to feed the burgeoning populations, understanding the interactions of plants with microbial inoculants and developing methods to improve their role in crop production, protection and biogeochemical cycling of nutrients is becoming increasingly relevant. In recent times, the use of microbial biofilm preparations has gained importance as a novel input in agriculture, besides consortia or co-inoculation to improve productivity in various crop plants. A biofilm is a congregation of microbial cells enclosed in a self-produced matrix of primarily polysaccharide material that is irreversibly associated with an abiotic or biotic surface. The biofilm mode of growth also confers a reproductive fitness advantage, because of differential growth rates and physiological heterogeneity among the members, compared to planktonic cells. Biofilms represent a strategy to overcome stress due to limitations of nutrients, changes in pH, or the presence of oxygen radicals, disinfectants, antibiotics, etc. Biofilms are also formed to facilitate colonization in a favourable niche, which presents an ideal site for the exchange of genetic material, more effectively compared to the planktonic cells (free floating cells).

Several microbial structures (flagella, fimbriae, pili, lipopolysaccharides, and membrane proteins) help the microorganisms form biofilms. Biofilm formation on the plant roots is an important trait of rhizospheric microorganisms, which prevents them from being detached from the plant caused by various natural processes occurring in the soil. Several genera of agriculturally important bacteria, fungi, cyanobacteria, including *Agrobacterium, Anabaena, Azospirillum, Azotobacter, Bacillus, Bradyrhizobium, Burkholderia, Clavibacter, Erwinia, Gluconacetobacter, Herbaspirillum, Mesorhizobium, Paenibacillus, Pantoea, Pseudomonas, Ralstonia, Rhizobium, Sinorhizobium, Trichoderma, Xanthomonas, Xylella* produce single, dual, or multispecies biofilms. From an agricultural perspective, knowledge of the relationships between biofilm formation and plant association has significant potential for exploitation in numerous fields including climate change, soil quality, plant nutrition, plant protection, bioremediation, etc. Development of multi-species biofilms using fungal/algal as a matrix with agriculturally important bacteria as partners showed positive effects on plant growth promoting traits, apart from acting as biocontrol agents in several crops including cotton. Application of biofilm based microbial formulations have been reported to enhance the root colonization, thereby improving the survival of applied bio-inoculants in the rhizosphere, enhanced plant growth, inducing the elucidation of natural plant defense enzymes, acting as biocontrol agents for managing pest and diseases, and improving soil health. Thus, the application of microbial inoculants as biofilm-based formulation will act as an ecofriendly input for sustainable agriculture.

Though beneficial effects of biofilmed microbial formulations have been tested in several crops, no study has attempted to evaluate the effects of microbial based microbial formulations in cotton. Therefore, field trials were conducted to study the effects of microbial based formulation (Fig. 1a and b) on cotton growth, yield attributes, and soil health. Field experiments were conducted at ICAR-CICR, Nagpur, and Coimbatore, in completely randomized design with the following ten treatments: T_1, Control (no nutrients & no Microbial Biofilm Formulation (MBF)), T_2, full doses of fertilizers (100 % Recommended Dose of Fertilisers (RDF) & no MBF), T_3, 75 % RDF & no MBF, T_4, Microbial biofilm formulation (MBF) as seed treatment, T_5, MBF as soil application (25 DAS), T_6, MBF as foliar application (at squaring, flowering & boll formation), T_7, MBF as seed treatment + soil application, T_8, MBF as seed treatment + foliar application, T_9, MBF as soil + foliar application, T_{10}, MBF as seed + soil + foliar application. All the plants receiving MBF treatments (T_4-T_{10}) received only 75% RDF. The cotton seeds (*Gossypium hirsutum* L. cv. Ajeet 155 BG II) were used in the experiment with 90 × 60 cm spacing. Observations were made on cotton growth, root attributes, yield, plant biochemistry, defense enzyme activities, and soil nutrients.

Overall, the inoculation of MBF as seed + soil + foliar application (T_{10}) significantly enhanced the cotton growth, root attributes, yield parameters, plant defense enzyme activities, and soil nutrient availability. Yield enhancement of 16 % (Seed Cotton Yield (SCY) 2206 kg ha^{-1}) was observed in the treatment T_{10} compared with 100 % RDF without MBF inoculation (SCY 1909 kg ha^{-1}) (Fig. 2a). Further, MBF inoculation as seed + soil + foliar application has enhanced root length by 11 %, root density by 15 %, root girth by 17 %, secondary root numbers by 24%, root surface area by 30 %, root:shoot ratio by 9 % compared to 100 % RDF without MBF inoculation. In case of soil nutrient availability, inoculation of MBF as seed + soil + foliar application has significantly enhanced the availability of organic carbon, N, P, K by 26 %, 12 %, 34 %, and 7 %, respectively, compared to 100 % RDF without MBF (Fig. 2b). With respect to micronutrients, inoculation of MBF as seed + soil + foliar application has significantly enhanced the availability of Zn, Mn, Cu, and Fe by 40 %, 77 %, 35 %, and 13 %, respectively, compared to 100 % RDF without MBF (Fig. 2c). In natural plant defense enzymes, MBF inoculation as seed + soil + foliar significantly

enhanced the activity of peroxidase (POD), polyphenol oxidase (PPO), catalase (CAT), phenyl ammonia lyase (PAL), and phenols by 45 %, 147 %, 75 %, 15 %, and 79 %, respectively compared to 100 % RDF without MBF (Fig. 2d). Apart from enhancing SCY, plant defense enzymes, and soil nutrient availability, the application of MBF as seed + soil + foliar treatment, saves 25 % cost on chemical fertilizer. From our study, it is evident that the use of microbial biofilm-based formulation (MBF) provides greater beneficial effects on plant and soil health. Therefore, MBF can be recommended as promising bio-inoculants to improve cotton productivity.

Fig. 1a. Bacterial isolates used in this study to develop Microbial Biofilm Formulation (MBF)

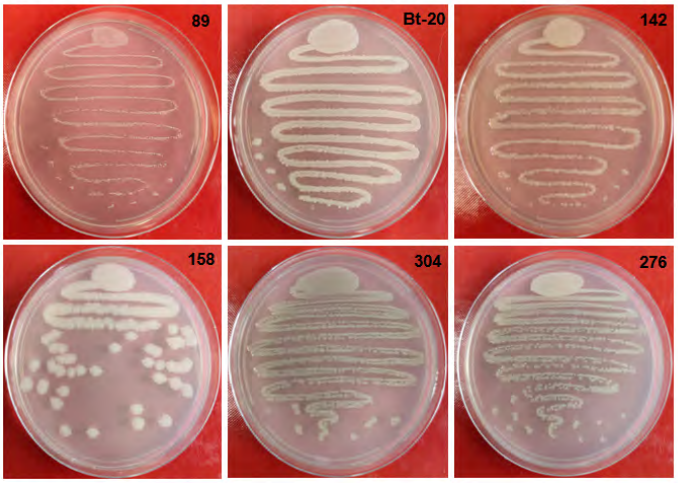
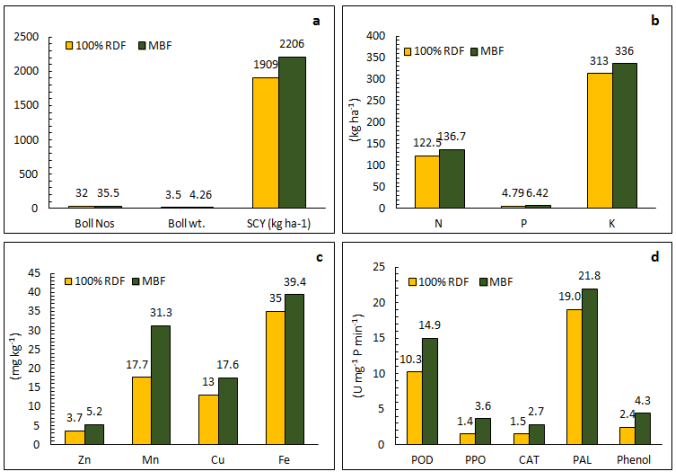


Fig. 1b. Root biofilm formation potential of bacterial isolates used in this study - crystal violet assay

Fig. 2. Effect of MBF on a) cotton yield contributing parameters, b) macronutrients availability, c) micronutrients availability, and d) plant defense enzyme activities



Popular Article

Performance of ICAR-CICR Compact and Semi-Compact Cultivars under High Density Planting System

R. Raja, S. Manickam and A.H. Prakash

ICAR-Central Institute for Cotton Research (CICR), Regional Station, Coimbatore

ICAR-CICR had developed and standardized high density planting system to improve the cotton productivity and to facilitate mechanization of cotton cultivation. Because of the higher yield potential realised in HDPS under rainfed and irrigated ecosystems, breeders in both public sector research organizations and private sector are developing improved compact and semi compact varieties and hybrids suitable for machine picking. The performance of ICAR-CICR compact culture (BB 7) and semi compact varieties (Subiksha, Suraksha, Suraj) was assessed during *kharif* 2021 at ICAR-CICR Regional Station, Coimbatore. Results indicated that compact culture BB 7 and semi compact varieties (Subiksha, Suraksha and Suraj) performed at par with Private sector compact hybrids under HDPS system in spite of the unfavourable weather condition (incessant rainfall and cloudy weather) prevailed during the reproductive stage of cotton crop .

Subiksha: 21.6 q ha^{-1} (1st week of August, 2021 sown crop with Mepiquat chloride application @ 60:30:30 ppm)

BB 7: 20.7 q ha^{-1} (1st week of August, 2021 sown crop with Mepiquat chloride application @ 60:30:30 ppm)

Suraksha: 27.4 q ha^{-1} (1st week of September 2021 sown crop with Mepiquat chloride application @ 60:30:30 ppm)

CICR Happenings

One day training program conducted at ICAR-CICR, Nagpur

One-day online training program on “Integrated Nutrient Management of cotton crop” was conducted for field facilitators and project managers of Ambuja Cement Foundation (ACF) on January 27, 2022. ACF is working extensively for agro-based livelihood generation among rural communities in more than 600 villages of Chandrapur and Nagpur districts of Maharashtra. About 65,000 farmers are cultivating better cotton in partnership with Better Cotton Initiative (BCI). Dr Y.G. Prasad, Director, ICAR-CICR, Nagpur, in his opening remarks, stressed on the importance of timely operations and role of plant nutrition in optimizing cotton yields and reducing the losses from different insect pests and diseases. Mr. Shrikant Kumhare, Program Manager, ACF gave an overview of the BCI program implemented by ACF. Dr M.V. Venugopalan, Principal Scientist, Agronomy welcomed all the participants in the beginning of the training program and delivered a lecture on ‘Organics for a healthy soil and high cotton productivity’. Dr A Manikandan, Scientist (Soil Science) delivered a lecture on ‘Need for soil sampling, analysis and interpretation’. A lecture on ‘Foliar guide to nutrient and plant growth regulators management’ was delivered by Dr J.H. Meshram, Principal Scientist (Plant Physiology). Dr. Ramkrushna G.I, Senior Scientist (Agronomy) delivered a talk on ‘Integrated nutrient management strategies for cotton’. A total of 144 participants (92 males and 52 females) attended the training program. Discussion session was held at the end of the lectures. The training was coordinated by Dr. Ramkrushna G.I. and Mr Pritam Kore, Training coordinator, ACF.

New Year celebrations

ICAR - Central Institute for Cotton Research, Nagpur, welcomed the New Year 2022 with bliss and fervor. Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur lighted the lamp and addressed the Staff. Fun games were also conducted for the Staff.

Republic Day Celebrations

The 73rd Republic Day was celebrated on January 26, 2022 at ICAR-CICR, Nagpur and Regional Stations, Coimbatore and Sirsa. On the occasion, the National flag was unfurled by Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur. He addressed the staff of Nagpur on the occasion. Dr. A. H. Prakash, Project Coordinator and Head, hoisted the National flag at CICR, Regional Station, Coimbatore and delivered the Republic Day address to the Staff. Dr. S. K. Verma, Head (I/c) inaugurated the programme by hoisting the National Flag at ICAR-CICR, Regional Station, Sirsa. All the staff actively participated in the programme.

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

The programme organized under different schemes during the month of January 2022 is as follows:

S. No.	Programme	Date	Place	Participants	Coordinated by	Under the scheme
1.	One day "Farmers Field training, input distribution cum Workshop on pink bollworm management"	January 7, 2022	Village-Thorana Taluka-Bhadravati Dist.- Chandrapur (MS)	50 farmers	Dr. V. Chinna Babu Naik Dr. Dipak T. Nagrale	TSP
2.	"Awareness campaign on pink boll worm management to ginners and farmers"	January 30, 2022	Girad, Samudrapur cluster, Dist.-Wardha	50 farmers	Dr. Shailesh P. Gawande Dr. Rachana Pande	NFSM: IRM-PBW
3.	"Farmers Field visit Training" program	January 1, 2022	Amravati district (MS)	28 farmers	Dr. B. B. Fand Dr. N.S. Hiremani	NFSM: IRM-PBW
4.	"Awareness in Ginners and cum Workshop" program	January 20, 2022	Tivsa, Dist.-Amravati	32 farmers	Dr. B. B. Fand Dr. N.S. Hiremani	NFSM: IRM-PBW
5.	Survey, surveillance and monitoring of IRM-PBW villages	January 4, 2022	Umred cluster, Dist.-Nagpur	50 farmers	Dr. Dipak T. Nagrale Dr. S. S. Patil	NFSM: IRM-PBW
6	One day "Farmers Field training, on pink bollworm management"	January 7, 2022	Village- Thorana, Taluka-Bhadravati, Dist.- Chandrapur (MS)	70 farmers	Dr. V. Chinna Babu Naik Dr. Dipak T. Nagrale Dr. T. Prabhulinga	NFSM: IRM-PBW

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.

Scientists' Corner

Publications, Awards, Recognitions and special assignments

- Arude VG, Sukla SK and Chinna Babu Naik V. (2022). Mechanical gin trash treatments system to prevent transmission of Pink bollworm from Cotton ginneries. *J. Cotton Research and Development.* 36(1), 111-119. (NAAS: 4.78)
- Chinna Babu Naik V and Rajasekhar. (2021). Mass trapping of pink bollworm in cotton. *Eeenadu Annadata*, December, 2021. (Telugu).
- Monga D and Sain SK. (2021). Threats from Emerging and New Diseases in Indian Cotton with Required Pest Risk Analysis: *Cotton Statistics and News*-CAI Vol 38 & 39: 1-4 & 4-5.
- Velmourougane, K., Manikandan, A., Blaise, D., Mageshwaran, V. (2022) Cotton stalk compost as a substitution to farmyard manure along with mineral fertilizers and microbials enhanced Bt cotton productivity and fibre quality in rainfed Vertisols. *Waste and Biomass Valorization https://doi.org/10.1007/s12649-022-01689.*

Meetings Attended/Participated

- All the scientific staff of ICAR-CICR, Nagpur and the Regional Stations, Coimbatore and Sirsa attended the Review meeting of Officers and Staff of ICAR Headquarters., Institutes of ICAR, ASRB and DARE on January, 4, 2022 under the chairmanship of Honourable Director General, Dr. Trilochan Mohapatra through video conferencing.
- Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head (I/C), Dr. Rishi Kumar, Principal Scientist (Entomology) and Dr. S. K. Sain, Principal Scientist (Plant Pathology), Dr. Amarpreet Singh, Scientist (Agronomy) from ICAR-CICR, Regional Station, Sirsa attended Review Meeting of officers and staff of ICAR, Institutes of ICAR, ASRB and DARE" with Dr. Trilochan Mohapatra, DG, ICAR, New Delhi on January 04, 2022 through virtual mode.
- Krishi Vigyan Kendra, ICAR - CICR, Nagpur organised "Scientific Goat Farming" under the program "Capacity Building of Farmers on Profitable Dairy Farming and Livestock Management" from 05th to 07th January, 2022 at KVK Training Hall. The Programme was sponsored by Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. Forty farmers got trained from the programme.
- Dr. A. Manikandan, Scientist (Soil Science) virtually participated in discussion of soil sampling strategy between ICAR-CICR, Nagpur and ICAR-ISSS, Bhopal for ICAR-Network program on Precision Agriculture (NePPA) on January 6, 2022.
- Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa delivered a lecture on "Plant Protection Equipment" in a training programme at KVK, HAU Sirsa on January 07, 2022. Forty farmers participated in the training program.
- Dr. Dipak T. Nagrale, Scientist, Plant Pathology, ICAR-CICR, Nagpur delivered an interactive lecture on "Integrated boll rot disease complex in cotton" in a one-day "Farmers Field training cum Workshop" program organized by ICAR-CICR, Nagpur under NFSM: IRM-PBW project on January 7, 2022.
- Dr. V. Chinna Babu Naik, Senior Scientist, Agricultural Entomology and Dr. T. Prabhulinga, Scientist, Agricultural Entomology, ICAR-CICR, Nagpur, trained the farmers on "Integrated Pink bollworm management in Cotton" and "Management of sucking pest complex in cotton" in a one-day "Farmers Field training cum Workshop" program organized by ICAR-CICR, Nagpur under NFSM: IRM-PBW project on January 7, 2022.
- Dr. V. Chinna Babu Naik, Senior Scientist, Agricultural Entomology, ICAR-CICR, Nagpur and his team monitored the infestation of pink bollworms in Cotton growing regions of Adilabad and Nirmal district of Telangana on January 9, 2022.

- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur participated as Chairman in the thematic workshop on “Diversification of Crops” on January 11, 2022 organized by Dr. K. S. Subramanian, Director of Research, TNAU, Coimbatore through virtual mode.
- A meeting was held to review the progress of work done on event UASD-78 under the Chairmanship of Dr. T. R. Sharma, DDG (Crop Science), ICAR on January 17, 2022 through virtual mode. Dr. M. V. Chetti, Vice Chancellor (VC), UAS, Dharwad, Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur, Dr. Ajeet K Shansy, Director, NIPB, New Delhi, Dr. P. L. Patil, Director Research, UAS, Dharwad, Dr. V. N. Waghmare, Head, Crop Improvement Division, ICAR-CICR, Nagpur, Dr. M. Manjula, Senior Breeder, UAS, Dharwad, Dr. Rohini Sreevathsa, Principal Scientist, NIPB, New Delhi and other scientists working on the event UASD-78 were present in the meeting.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. M. V. Venugopalan, Head, PME Unit, ICAR-CICR, Nagpur and Dr. A. R. Reddy, Principal Scientist, Agricultural Economics, ICAR-CICR, Nagpur participated in the online workshop on Crop Diversification on January 17, 2022 organised by Deputy Director of Horticulture, Commissionerate of Agriculture, Shivaji Nagar, Pune, Maharashtra.
- Dr. Rishi Kumar, Principal Scientist (Entomology) ICAR-CICR, Regional Station, Sirsa delivered a project presentation on “Development of transgenic cotton varieties through marker assisted event pyramiding for broad spectrum insect resistance'” to expert panel of NASF on January 17, 2022 through video conference.
- Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head (I/C) and Dr. Amarpreet Singh, Scientist (Agronomy) ICAR-CICR, Regional Station, Sirsa participated in the Meeting on “Scaling up of poly mulch-drip fertigation technology” organized by ICAR-CICR, Nagpur on January 18, 2022 through virtual mode.
- Dr. Ulhas Nandankar, Sr. Farm Superintendent, Member Secretary, Farm Advisory Committee organised Farm Advisory Committee (FAC) Meeting on January, 18, 2022. All the members of the FAC were present in the meeting along with Director, ICAR-CICR, Nagpur.
- Dr. S. Manickam, Principal Scientist, Plant Breeding& Genetics, ICAR-CICR, Regional Station, Coimbatore was nominated as the member of selection committee for the selection of one number of Young Professional - II and one number of Senior Research Fellow by the Director, ICAR - Sugarcane Breeding Institute, Coimbatore and the interview was held on January 19, 2022.
- Dr. Amarpreet Singh, Scientist (Agronomy) and Sh. Debashis Paul, Scientist (Seed Technology) surveyed the ginning-cum-oil extraction mills of Northern States for Pink Bollworm surveillance and monitoring on January 05, 2022 at Sriganganagar, Rajasthan and January 19, 2022 at Ellanabad, Sirsa, respectively. Cotton seed samples were collected from the mills for further investigation.

- Dr. S. K. Verma, Principal Scientist (Plant Breeding) and Head (I/C), Dr. Rishi Kumar, Principal Scientist (Entomology) and Dr. S. K. Sain, Principal Scientist (Plant Pathology) from ICAR-CICR, Regional Station, Sirsa attended GEAC meeting to discuss the common trials of North Zone on January 21, 2022. Dr. Verma attended the meeting physically at Bhatinda and Dr. Rishi and Dr. Sain participated the meeting through virtual mode.

- Dr. K. Baghyalakshmi, Scientist (Genetics and Plant Breeding), ICAR-CICR, Regional Station, Coimbatore attended training on “Analysis of Experimental Data” organised by NAARM, Hyderabad from January 17-22, 2022
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. M. V. Venugopalan, Head, PME Unit, ICAR-CICR, Nagpur, and Dr. S. Manickam, Principal Scientist, Plant Breeding & Genetics, ICAR-CICR, Regional Station, Coimbatore participated in the “Stakeholder Information Meeting on ELS Study” on January 21, 2022 organised by Dr. Rossitza Krueger, German Corporation implemented by GIZ through video conferencing.
- Dr. A. H. Prakash, Project Coordinator and Head, ICAR- CICR, RS, Coimbatore and Dr. S. Manickam, Principal Scientist, ICAR-CICR, RS, Coimbatore attended the Stakeholders information meeting organised by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) with the Ministry of Textiles on January 21, 2022 virtually.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur participated as Guest of Honour in the “Webinar on Standards Pertaining to Agriculture and Irrigation” on January 25, 2022 organised by Bureau of Indian Standards (BIS), Nagpur.
- Dr. V. S. Nagrare, Principal Scientist, Agricultural Entomology, ICAR-CICR, Nagpur attended Second Biannual Subcommittee meeting of ‘National Network of Plant Health Experts’ organized by NIPHM, Hyderabad on January 25, 2022.
- One-day online training program “Integrated Nutrient Management of cotton crop” was conducted for staff of Ambuja Cement Foundation (ACF) on January 27, 2022. A total of 144 field facilitators and Project Managers got benefitted from the program.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur along with Dr. M. V. Venugopalan Head, PME Unit, ICAR-CICR, Nagpur, participated in the Round Table Meeting on Cotton High Density Planting System on January 27, 2022 organised by PJTSAU, Rajendra Nagar, Hyderabad through virtual mode.
- Dr. Amarpreet Singh, Scientist (Agronomy) ICAR - CICR, Regional Station, Sirsa participated in the Meeting of “Nagar Rajbhasha Karyanvayan Samity (NARAKAS), Sirsa” regarding Hindi Language on January 27, 2022 through virtual mode.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur, Dr. M.V. Venugopalan, Head, PME unit, ICAR-CICR, Nagpur, Dr. A. H. Prakash, Project Coordinator and Head, ICAR-CICR-RS, Coimbatore, Dr. A. R. Reddy, Principal Scientist, Agricultural Economics, ICAR-CICR, Nagpur, Dr. Isabella Agrawal, Principal Scientist, Agricultural Economics and Dr. M. Sabesh, Senior Scientist, Computer Applications, ICAR-CICR-RS, Coimbatore participated in the meeting with Cotton Organizations regarding Price Policy for Kharif Crops 2022-23 marketing season on January 28, 2022 through video conferencing.
- Meeting of the Committee to examine proposals for transfer/sale/purchase/change in name of GEAC approved Bt cotton hybrids, under the chairmanship of ADG (Seeds), ICAR on January 28, 2022 was attended by Dr. A.H. Prakash, Project Coordinator and Head, ICAR-CICR- RS, Coimbatore through video conferencing.
- Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur participated in the National Seminar on “Empowerment of Rural Youth with Novel Agricultural Technologies” organized by the Andhra Agricultural Union (Governing body of the Agricultural Andhra Journal) on 28th and 29th January, 2022 and delivered a lecture on “Skill Development and Entrepreneurship Models for Rural Youth in Plant Protection”

Farmers' Corner

Successful Adoption of "Insecticide Resistance Management (IRM) strategies in cotton enhanced farmers' income: Shri. M. Rajannan from Sokkanur shares his success story

As a part of outreach activities, the ICAR-CICR, Regional Station, Coimbatore had initiated National Food Security Mission (NFSM) funded project on "Insecticide Resistance Management (IRM): Dissemination of pink bollworm strategies" in *Kinathukadavu* block of Coimbatore District, Tamil Nadu from 2018. During the current season, 50 farmers from *Palanigoundanur*, *Muthugoundanur*, *Sokkanur*, *Veerappagoundanur*, *Sattakkalpudur* villages were adopted for the implementation of project activities. The farmers were trained on plant protection technologies through lectures, field demonstrations, group meetings and exhibitions. Farmers were imparted training on pest monitoring with pheromone traps, use of bio-control agents and safe handling of insecticides. The fields were monitored for sucking pests, natural enemies and boll damage at weekly intervals. The farmers were given critical inputs and advised to follow the plant protection measures.

Shri. M. Rajannan (Mobile No:9600372527), an adopted farmer from the Sokkanur village with a land holding of 6.5 acres, cultivating cotton, tomato and *bhendi,* actively participated in the training programmes organized under IRM project. The farmer started using pheromone traps for pest monitoring; could identify various life stages of insect pests and their damage symptoms and learned the concept of economic threshold level (ETL) in deciding the timing of insecticide spray. He got trained on the use of biocontrol agents and release of egg parasitoid in cotton, safe handling of pesticides and timely crop termination to prevent pest carryover of pink bollworm in cotton. He used to get annual income of Rs. 3, 91, 226 from the crops and faced problems like pest and diseases, non availability of labour and increased input cost etc. With DFI interventions like better yielding and pest tolerant genotypes, supply of critical inputs like pheromone traps, biocontrol agents, insecticides, growth regulators etc., he is getting an annual income of Rs. 5, 97,825. By following the IRM strategies, he could reduce the number of insecticides his cotton crop as against 7-8 sprays by the neighboring farmers. He spent Rs. 9,240/ha for the pesticide sprays as against Rs.16, 850/ha by the non-IRM farmer which resulted in the reduction of cost of cultivation and increased net profit with a benefit cost ratio of 1.83 in cotton.

(Shri. Rajannan)

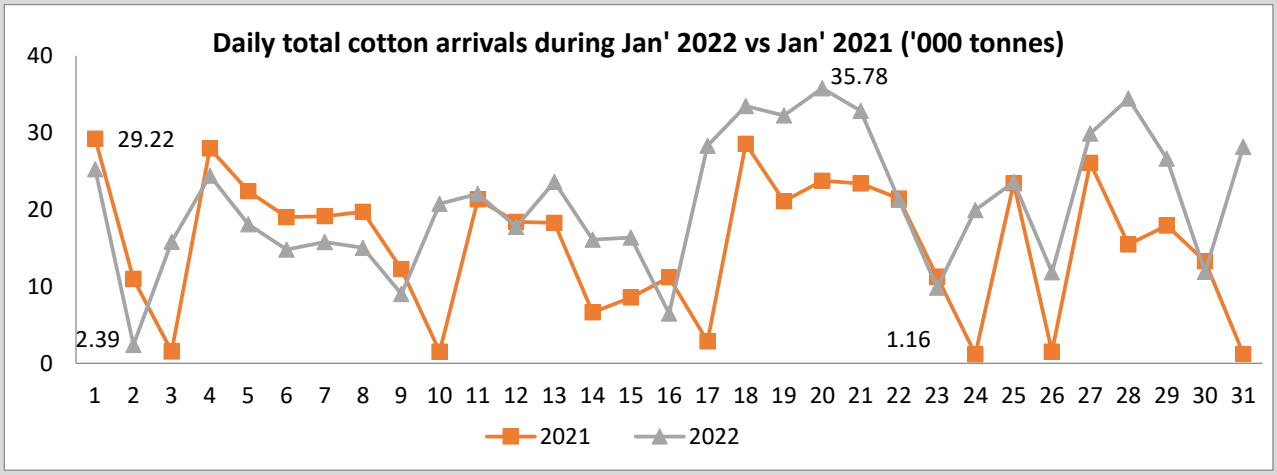
Information provided by,
Dr. K. Rameash,
Principal Scientist (Agrl. Entomology),
ICAR-CICR, Regional Station, Coimbatore

Cotton Statistics and Scenario

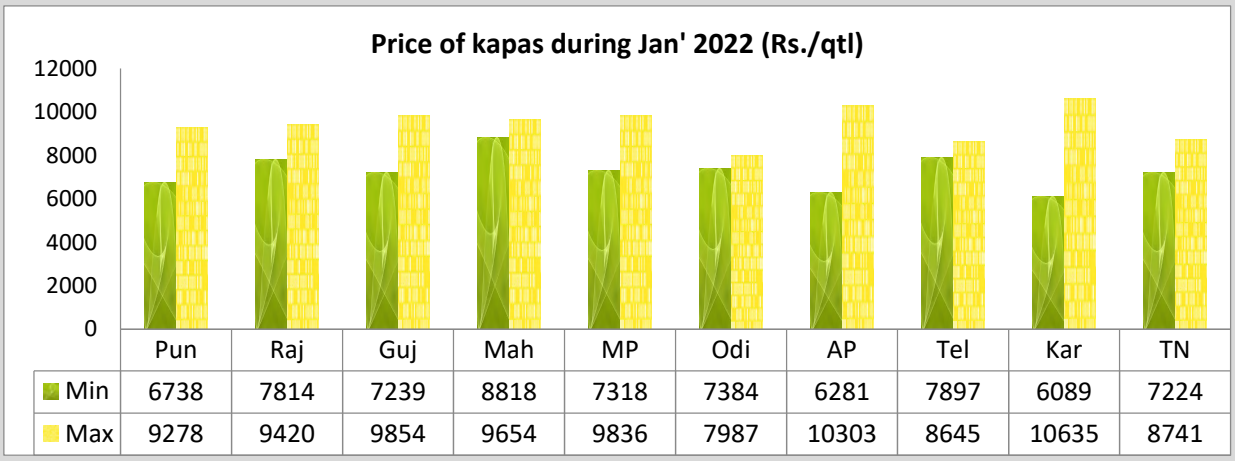
Cotton Scenario during January 2022

Isabella Agarwal and A. R. Reddy

Globally, cotton prices increased to a tune of 12 to 13% since the start of the year and 58 per cent year-on-year. As per the Cotton Association of India press release, cotton production estimates were cut by 12.00 lakh bales to 348.1 lakh bales, whereas domestic consumption increased by 10 lakh bales to 345 lakh bales compared to last year consumption. Thus, the closing stocks estimated for the next season will be down by almost 30 lakh bales to 45.1 lakh bales of 170 kg compared to 75 lakh bales carried forward this season.



Daily cotton arrivals during the first two weeks of Jan' 2022 was lesser than that of Jan' 2021 but after that there was quantum jump with peak of 35.78 '000 tonnes during the final weeks of the month. The reason behind this was the price escalation in the market.



	Pun	Raj	Guj	Mah	MP	Odi	AP	Tel	Kar	TN
Min	6738	7814	7239	8818	7318	7384	6281	7897	6089	7224
Max	9278	9420	9854	9654	9836	7987	10303	8645	10635	8741

The average price of around Rs 9,500 is almost double as compared to last year's average price of around Rs 5,500. The surge in prices can be attributed to the low production due to heavy unseasonal rains in parts of the country. The high demand for the produce in the international market has also triggered the hike in the prices. December-January marks the peak of cotton marketing season and supply is almost half as compared to normal years as per traders. Bullish market sentiments have led to an increase of 10% in cotton prices in just about a month. Good demand for exports as well as for domestic consumption and staggered release by farmers, have supported the uptrend in the prices of the cotton crop.

Cotton in Media

अंगोवन

गुलाबी बोंड अळी व्यवस्थापन कार्यशाळा

अँग्रोवन वृत्तसेवा

चंद्रपूर : भारतीय कृषी संशोधन परिषद अंतर्गत असलेल्या केंद्रीय कापूस संशोधन संस्थेच्या वतीने भद्रावती तालुक्यातील थोराना गावात 'गुलाबी बोंड अळीचे व्यवस्थापन' या विषयावर शेतकऱ्यांसाठी कार्यशाळेचे आयोजन करण्यात आले. केंद्र शासन पुरस्कृत कीटकनाशक व प्रतीकारक्षमता तसेच गुलाबी बोंड अळी व्यवस्थापन या प्रकल्पांतर्गत ही कार्यशाळा आयोजित करण्यात आली.

प्रकल्पाचे जिल्हा समन्वयक डॉ. चीत्राबाबू नाईक (वरिष्ठ शास्त्रज्ञ कीटकशास्त्र), यांनी गुलाबी बोंड अळीचा प्रादुर्भाव, कामगंध सापळे, ट्रायकोकार्डचा वापर याविषयीची माहिती दिली. वनस्पती रोगशास्त्रज्ञ डॉ. दीपक नगराळे यांनी गुलाबी बोंडअळी आणि बोंडसड विकृती प्रादुर्भाव यातील फरकाविषयी मार्गदर्शन केले. डॉ. प्रभुलिंगा यांनी कापसावरील रसशोषक किडीच्या नियंत्रणासाठीच्या उपाययोजनाविषयी सांगितले. भूषण मुंजेकर यांनी गुलाबी बोंड अळी, बोंडसड कसे ओळखावे याविषयी प्रेझेन्टेशन सादर केले. कापसावरील गुलाबी बोंड अळीच्या नियंत्रणासाठी या किडीची जीवन साखळी खंडित होणे गरजेचे आहे. त्याकरिता शेतकऱ्यांनी फरदड न घेण्याचा सल्ला या वेळी तज्ज्ञांनी दिला. प्रशिक्षणात रायगाव, माणगाव या गावातून सुमारे ७० शेतकरी सहभागी झाले होते.

Nagpur, Main
23/01/2022 Page No. 5

जैविक कापूस उत्पादनाला देणार प्रोत्साहन

विभागीय कृषी सहसंचालक किसन मुळे : मूल्यवर्धनाला प्राधान्य

विनोद इंगोले : अँग्रोवन वृत्तसेवा

अमरावती : रासायनिक कापसाच्या तुलनेत जैविक कापसाला जास्त दर मिळतो. त्यामुळे जैविक शेती पिकवण्याच्या सहकापनि सेंद्रिय कापूस उत्पादनाला प्रोत्साहन देत स्मार्ट प्रकल्पातून मूल्यवर्धन करून शेतकऱ्यांना जास्त उत्पन्न मिळेल, या करिता प्रयत्न केला जाईल, अशी माही नवनियुक्त विभागीय कृषी सहसंचालक किसन मुळे यांनी दिली.

अमरावती विभागीय कृषी सहसंचालक म्हणून किसन मुळे यांनी सोमवारी (ता. ३) पदभार स्वीकारला, या वेळी 'अँग्रोवन'ने सोबत बोलताना त्यांनी आपली भूमिका मांडली, अमरावती विभागात कापूस, सोयाबीन या सोबतच सुमारे एक लाख शेतकरच संत्रा लागवड आहे. या भागातील कापूस उपादकांना हंगामात बाबाराव दरगीळ चढ-उतारचा सामना करावा लागतो, या बेळी आगतिक स्तरावर मागणी वाढल्याने कापसाचे दर तेजीत आहेत, अशी परिस्थिती प्रत्येक वेळी राहत नाही, त्यामुळे कापसाचे मूल्यवर्धन गरजेचे आहे, त्याकरिता स्मार्ट प्रकल्पाची मदत घेतली जाईल, स्मार्ट प्रकल्पातून एक गाव एक वाण व कापसाची गाठ बांधन कापूस उत्पादकांना चांगला परताचा कसा मिळेल यावर लक्ष केंद्रित केले जाईल. रासायनिक कापसाच्या तुलनेत सेंद्रिय कापसाला चांगला परताचा मिळतो, ही बाब लक्षात घेता जैविक शेती मिशनच्या माध्यमातून सेंद्रिय कापूस उत्पादन आणि मूल्यवर्धनाला प्रोत्साहन देण्याचे प्रस्तावित आहे. अधिकारी कर्मचारी यांच्यामध्ये विसंवाद घडू नये व आंदोलनाची वेळ येऊ नये याकरिता समुपदेशनावर लक्ष केंद्रित करण्यात आहे.

संत्र्यांच्या विक्री व्यवस्थेवर भर देणार

अमरावती जिल्ह्यात सुमारे एक लाख हेक्टरवर संत्रा लागवड आहे वरुड, मोर्शी हे तालुके विदर्भाचे कॅलिफोर्निया म्हणून ओळखले जातात. मात्र या भागातील संत्रा उत्पादकांसमोर अनेक अडचणी आहेत. त्यामध्ये शास्त्रोक्त व्यवस्थापनाकरीता तांत्रिक मार्गदर्शनाचा अभाव, बाजारपेठ असे अनेक मुद्दे आहेत. त्यांच्या सोडवणूकीसाठी शेतकरी शास्त्रज्ञ सुसंवाद या सारख्या उपक्रमाचे आयोजन होईल. या भागातील संत्रा उत्पादकांना बाजारपेठ मिळावी याकरीता देखील प्रयत्न करणार आहे. विदर्भातील संत्र्याला पुण्या-मुंबईत मागणी आहे. शेतकरी उत्पादक कंपन्यांच्या माध्यमातून या भागातील संत्रा पुण्या-मुंबईत पाठवला त्या भागातील शेतमाल या भागात विक्रीचा प्रयत्न केला जाईल, असेही किसन मुळे यांनी सांगितले.

Sakal Agroone, 11.01.2022

Cotton surpasses historic Rs 10,000/quintal mark in Vid

By Niraj Chinchkhede

PREVAILING market conditions seem to have been proving a game changer for cotton as its price has surpassed the historic Rs 10,000 per quintal mark on Tuesday. It is for the first time in the history when raw cotton has fetched the farmers Rs 10,200 per quintal.

Many dealers based in the Hinganghat Mahni (in Wardha district) and farmers confirmed that the price of the farm produce made a record high on Tuesday.

It is important to note that the prices of cotton were going through the roof in the current season which has witnessed drastic fall in production due to unfavourable climatic conditions.

Rohit Rander, one of the leading cotton dealers, told *The Hitavada* that cotton is in great demand in many countries which is eventually pushing up the prices. Besides, the current season has also seen drastic fall in cotton yields. "This has created a mismatch between supply and demand of cotton," he added.

Against the estimated production of 345 lakh bales of cotton for the current season, the traders are expecting only 300-310 lakh bales and so they are aggressive-ly buying the commodity.

(Contd on page 2)

Cotton surpasses historic Rs 10,000/quintal mark in Vid

However, Rander is not very optimistic on further hike in the cotton market and said that the current level might not sustain for too long. "The market may see a correction in the cotton prices in near future as many parameters are not supporting it," he felt.

As soon as the cotton harvesting season began in October (2021), most of the developed nations including the USA started buying the commodity in huge quantities. Similarly, the farm produce was also in great demand in the domestic markets and thus the prices started flying up right from the early days.

In October 2021, cotton prices had crossed the level of Rs 8,000 per quintal.

The cotton price posted further hike in the following days to reach the new all time high of Rs 10,200 per quintal on Tuesday, a level well above the minimum support price (MSP) of Rs 6,025 per quintal for the current season.

Apart from this, the natural fiber is trading at a high level in most of the commodity exchanges around the world. Moreover, the Cotton Corporation of India is reportedly running short of carry forward stock.

Farmers of the region, who often fail to recover even the cultivation costs, had sold raw cotton at a price between Rs 5,400 and Rs 6,000 per quintal in the last season when its MSP was Rs 5,825 per quintal.

Cotton is one of the major crop in the Vidarbha which has also seen a large number of the farmers' suicides in recent past. But in the current season, the farmers are quite happy to see the price making a new high every passing day.

The Hitavada
5 January, 2022

कापूस उत्पादकांना वाचवेल 'पीबी नॉट'

डॉ. सी. डी. मायी

'पीबी नॉट' हे संशोधन गुलाबी बोंड अळीच्या व्यवस्थापनासाठी खूप उपयुक्त आहे. हे तंत्र वापरायला सोपे, पिंक बोंडअळीचा मुख्या कणारो आणि पर्यावरणपूरक आहे. हे तंत्र अधिकाधिक कापूस उत्पादक शेतकऱ्यांपर्यंत पोहोचायला हवे.

Sakal Agroone, 20.01.2022

Cotton growers anxious over textile min-industry meeting

Shishir.Arya@timesgroup.com

Nagpur: A likely meeting on Monday between textile ministry and industry stakeholders over rising cotton rates has left the farmers in Vidarbha anxious.

With smart phones being used even in the hinterland, media reports of Monday's meeting have been quickly shared in villages. As cotton growers of the region are now waiting for more news on the meet, this has also left them miffed.

The textile industry has been demanding measures to reduce rates, which have touched Rs30,000 a quintal, and cut in import duty on the commodity.

Farmers say this would take away the once-in-decade opportunity for them to get a decent rate.

"A number of farmers have received the news about the meeting on mobile. As we are following the news for the final outcome, this has left the farmers disappointed and many want to register their protest," said **Nitin Khadse** from Jalka village in Yavatmal — infamous for agrarian crisis.

"For years, cotton prices have been fetching minimum support price (MSP) or slightly below it. Now, if the rates are high for a single year, the industry is seeking government intervention," he said.

FATE AWAITED

Arun Sekhsaria, managing director of export firm DD Cotton, said, "There seems to be no need for intervention. It's part of the business as even farmers' income needs to go up."

"Why should farmers compromise always. Even the industry and the consumer should be ready to shell out more," said **Anil Ghanwat**, president of Shetkari Sanghatana. Ghanwat was also a member of the Supreme Court appointed committee on the now scrapped three farm laws.

Meanwhile at Yavatmal, cotton grower **Ravindra Wadal** says his output is his bank last year's, but may earn more. Wadai has held on to close to 80 quintals of cotton harvest, in the hope to get a better rate. It would be a loss if any government decision brings down the rates, he says.

Farm activist **Vijay Jawandhia** says even if imports are eased, it may have little impact, because even the international rates are on the higher side. There are chances that a section of players may import small quantity at parity price only to dampen the domestic market sentiment.

"It's not that the farmers are reaping super profits. In 2019-20, cotton was sold even at Rs4,300 a quintal, which was below the MSP. In 2011, the rates were at Rs6,500. It's not much if it touches Rs10,000 a decade later," says **Ganesh Nanote**, a farmer from Akola.

Times of India, 17.1.2022

Cotton prices touch a new high

- Cotton sold for Rs 10,605 in Hinganghat APMC

Our Correspondent
HINGANGHAT, Jan 20

THE graph of cotton prices continued to scale northward as on Thursday the prices touched a new peak of Rs 10,605 per quintal in the Hinganghat Agriculture Produce Marketting Committee. The cotton was bought at the Renuka Cotton Ginning Factory on Thursday.

On Thursday, the prices started with average Rs 10,200 and reached to Rs 10,605. Thursday 7,072 quintals of cotton arriving in 460 small and big vehicles.

It is noteworthy that farmers from Ghatanji, Pandharkawada, Ralegaon, Umarkhed, Navargaon Bhisi, Warora, Bhadravati and other places from Yavatmal, Nagpur Chandrapur, Amravati and Wardha district brought their produce to Hinganghat for sale.

Till Wednesday, Hinganghat APMC had 60,892 quintal cotton. The cotton purchase had started from October 18, 21.

At that time, the cotton was sold at a price of Rs 6,700. Month of November saw a risein prices which went upto Rs 9,000 in December.

With price of cotton heading northward in international markets, the price crossed Rs 10,000 per quintal mark in January.

The Hitvada, 21 January 2022

'Allow duty-free cotton import with quantitative restrictions'

High raw material cost spurs demand by textile industry

M. SOUNDARYA PREETHA
COIMBATORE

The textile and clothing industry, which is facing high raw material costs, has sought duty-free import of cotton with quantitative restrictions.

Textile machinery manufacturers are delivering almost two lakh spindles a month, said T. Rajkumar, chairman of Confederation of Indian Textile Industry.

This means that substantial addition of production capacity has been taking place. Thus, cotton consumption by textile mills

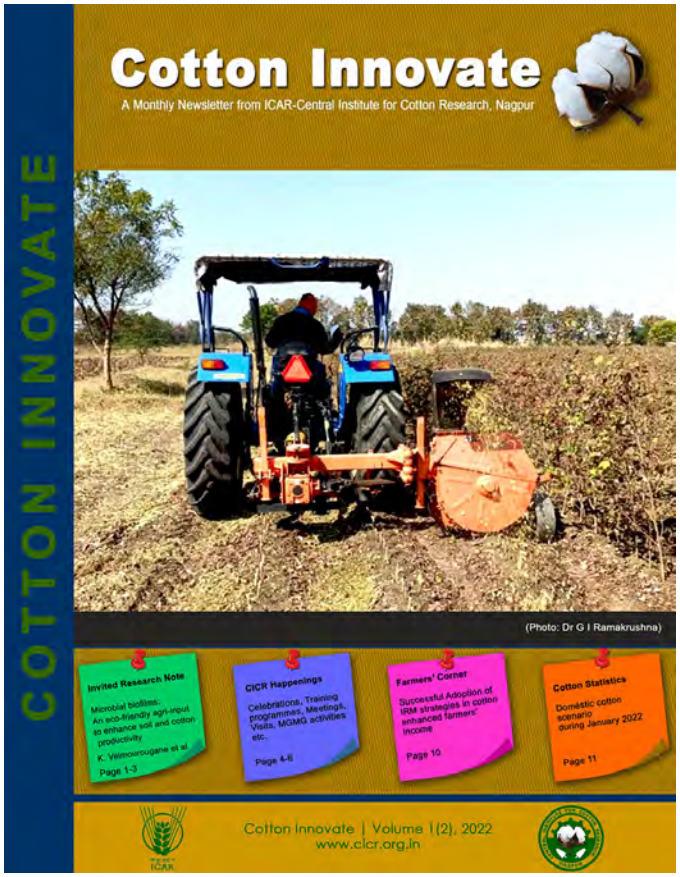
reached ₹80,000 a candy, rising from ₹40,300 in January 2021 and ₹52,000 a candy on October 1, 2021. There is hardly any cotton arriving at the markets, according to Ravi Sam, chairman, Southern India Mills' Association.

"The best of mills have just one-and-a-half months' cotton stock," he added. The Centre must permit 30 lakh bales of duty-free import of cotton for April-September, and that too only by end-users of cotton, Mr. Rajkumar and Mr. Sam urged.

Mills have to start booking cotton now to ensure ship-

bales while cotton production is estimated to be almost 350 lakh bales, compared with 360 lakh bales in the previous season.

Every year, 40-45 lakh bales turn out to be of poor



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