

Cotton Innovate

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



Ectoparasitic mite, *Bochartia* sp. feeding on the first instar nymph of jassid., Photo By:Dr. K. Rameash

Invited Research Note

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Oviposition deterrence against old world bollworm, *Helicoverpa armigera* (Hübner)

Rachna Pande*, Shah Vivek, Pooja Verma, Nandini Gokte-Narkhedkar

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

*Corresponding author: rachna.ento@gmail.com

The old-world bollworm, *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) is a major insect pest of cotton. *H. armigera* is a widely distributed polyphagous pest. It is found to feed on more than 182 host plants including many cereals, pulses, fibre and horticultural crops and cause economic damage. Previously in India more than half of the insecticides were used on *H. armigera* which reflects the significance of this menace. Indiscriminate usage of pesticides enabled the *H. armigera* in developing resistance against most of the pesticides. Introduction of *Bt* cotton reduced its damage, however time to time various reports from all over the world including India states that *H. armigera* and its close relatives are able to survive in *Bt* cotton. Therefore, alternative management practices need to be developed to manage this pest in future. Across the globe use of info-chemicals has become a trend as it is safer to environment and it controls the pests by altering their behaviour. Info chemicals may be utilized to disrupt feeding, mating or even the oviposition. Among these ideas', oviposition deterrent is one of the most promising tools as it creates the first line of defence by reducing the number of eggs laid on targeted crops. Different researchers have reported that the compounds especially fatty acids present in larval frass reduce the egg laying of conspecific females of lepidoptera and coleoptera. Larval frass of *H. armigera* also contains fatty acids viz., linoleic, palmitic, stearic and myristic acid and according to literature these compounds showed the oviposition deterrent activity in insects when applied in different ratio. Hence, vegetable oils containing these fatty acids at different ratio were evaluated as oviposition deterrents against *H. armigera* under laboratory conditions. The study was conducted at ICAR-Central Institute for cotton Research (ICAR-CICR) Nagpur (21°04'48.39" N 78°06'58.02" E) Maharashtra, India. Population of *H. armigera* was raised on chick pea-based diet. Muslin cloth was used as oviposition substrate. The presence of fatty acids in vegetable oil was confirmed by Gas chromatography-mass spectrometry (GC-MS) (Shimadzu QP-2020) (Table 1).

Table 1: Details of oils evaluated as oviposition deterrent with presence of fattyacids

S. No.	Oils	Oleic	Linoleic	Palmitic	Stearic	Myristic
1	Groundnut	+	+	+	+	
2	Sunflower	+	+			
3	Ricebran	+	+	+	+	+
4	Soybean	+	+	+	+	
5	Safflower	+	+	+	+	
6	Sesame	+	+	+	+	
7	Palm	+		+		
8	Sheabutter	+	+	+	+	

+ shows the presence of fatty acids in an oil

Bioassays were conducted using oils in order to evaluate their role as oviposition deterrents. Two pairs of male and female were used for bioassay. Adult pair was allowed to mate for 48 hrs. Muslin cloth was treated with different concentrations of oils (0.2, 0.4, 0.6, 0.8 1.0, 2.0, 3.0%) and used as oviposition substrate. Methanol (solvent) treated muslin cloth was used as control. Mated pair was exposed to treated muslin cloth and after 5th day of treatment, experiment was terminated. Removed muslin cloth was stored and hatchlings were counted in each treatment. It was observed that number of eggs laid by the female decreased significantly with increase in concentration of fatty acids.

Table 2: Comparison of oils on the basis of concentration

Oils	> 50% reduction
Sunflower	1
Soybean	1
Palm oil	1
Ground nut	2
Ricebran	2
Safflower	2
Sesame	2
Shea butter	-

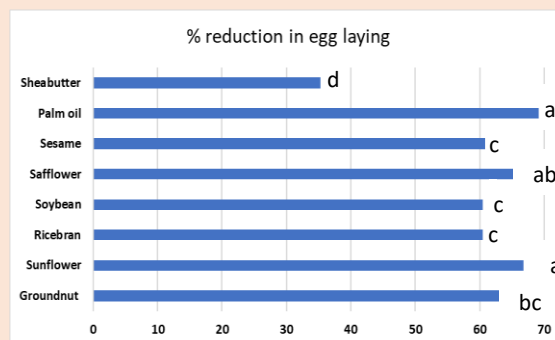


Fig. 1 Per cent reduction in egg laying at highest concentration (3%)

Results of the experiment revealed that all the oils were effective and showed promising results as an oviposition deterrent against *H. armigera* except Shea butter although it showed the presence of all the four fatty acids except myristic acid in GCMS. Shea butter is a vegetable fat at room temperature and hence it was not miscible with methanol properly which might have altered the concentration of shea butter in final solution. It was recorded that oils of ground nut, rice bran, safflower and sesame caused 50% reduction in egg laying at 2% concentration. However sunflower, soybean and palm oil showed same efficacy at 1% concentration (table 2). The data presented in table 2 confirmed that sunflower, soybean and palm oil were more effective in comparison to ground nut, rice bran, safflower and sesame as they cause more than 50% reduction in egg laying at 1% concentration. At highest concentration all the oils caused more than 60% reduction in egg laying except shea butter. Maximum per cent reduction in egg laying was recorded in palm oil with more than 65 % reduction which was on par with sunflower oil and safflower oil (Fig 1). Hence the above results confirmed the role of vegetable oils as an oviposition deterrent. These findings have opened the new direction of ethological pest management of *H. armigera* which is eco-friendly in nature. All the oils, except shea butter irrespective of containing different type of fatty acids caused more than 60% reduction in egg laying. However further intensive field study is needed for the confirmation of the statement.

Cotton Seed: Source of survival of Pink Bollworm (PBW) during off season

Rishi Kumar, Debashis Paul, Amarpreet Singh, S. K. Sain and S. K. Verma

ICAR-CICR, Regional Station, Sirsa- 125055, Haryana

The cotton crop experienced a devastating loss due to infestation of Pink Bollworm (PBW) during the previous season (2021-22) in cotton growing zone of North India. Several initiatives by Central and State Government were taken to find out the management strategies of PBW for the upcoming season. Since pink boll worm is a functional monophagous pest, its survival during off season plays an important role in its infestation during ensuing season. As per the earlier reports available, seed cotton, cotton seed stored in godowns, ginneries or oil extraction mills as well as the stacked cotton stalks are the source of survival of PBW during off season. Among these, several reports have identified cotton seed as a prominent source of survival of PBW during off season. For proper management of PBW it is very important to know the source of infestation along with the survival of PBW during off season also. Although PBW can hibernate in single cotton seed of good size, it generally hibernates between two cotton seeds by joining them resulting in formation of double seeds which serve as a major source of PBW survival.

To estimate the magnitude of survival, a survey in ginning cum oil extraction mills of North zone (comprising the states Haryana, Punjab and Rajasthan) was done during December, 2021 to March, 2022. A total of 64 ginning mills cum oil extraction mills were surveyed comprising 28 in Haryana, 21 in Rajasthan and 15 in Punjab, respectively. A 500 g sample of cotton seed was collected from all the ginning mills to estimate the extent of larvae, pupae, damaged seeds and double seeds present in the samples collected. In general the ginning and oil extraction mills purchased the cotton seed from local markets. It was found that the number of surviving larvae per seed samples ranged from 2 (two) to 10 (ten), from 1 (one) to 3 (three) and from 1 (one) to 4 (four) in the state of Haryana, Rajasthan and Punjab, respectively. The highest quantity of damaged seeds due to PBW was found in the samples collected from ginning mills of Haryana followed by Rajasthan and Punjab. Results showed the higher number of double seeds obtained from the samples collected from Haryana state, especially from Jind district. Furthermore, a special survey was conducted in Sirsa at the ginning cum oil extraction mills that purchased the cotton seeds (binola) from south zone. It was found that the availability of surviving larvae was much higher in cotton seed samples collected from seed outsourced from southern zone as compared to samples of local seed cotton.



PBW- Survival in Double Seed



PBW-Survival in single Healthy Seed

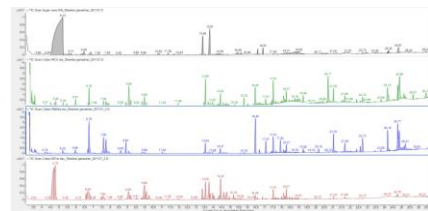
The number of surviving larvae per 500 g cotton seed samples ranged from 15 to 22 in the samples collected from these mills. In the cotton seed samples outsourced from South Zone the quantity of damaged seeds and double seeds were ranged from 45.13 to 84.20 g and 2.91 to 3.58 g, respectively. The holistic survey result covering all the three states confirmed cotton seed as a major source of PBW survival during off season and can be a cause of threat for the cotton growers of North zone during the ensuing season. Therefore advisory to store the seeds in close godowns, utilization of seed cotton or cotton seed till month of March and fumigation thereafter is issued regularly for the benefit of the farmers.

Semiochemical based attractants for cotton stem weevil management
K. Shankarganesh and, K. Rameash, ICAR-CICR Regional Station - Coimbatore

Cotton stem weevil *Pempherulus affinis* (Faust) Curculionidae: Coleoptera) causes significant yield loss in Bt as well as non Bt cotton varieties and hybrids in India. Infestation of the weevil occurs in 12-15 day old seedlings. During the early days of the crop, the mortality rate of the plant reaches up to 90% (Ballard 1922). Cotton seedlings of 10 to 25 days old were vulnerable to this pest. Several insecticides have been recommended for managing stem weevil. Despite the use of insecticides, it is becoming difficult to manage this pest by the cotton growers at times. Studies by several authors suggest that conventional insecticides belonging to organophosphorous, carbamate and synthetic pyrethroids have often failed to check the field population of stem weevil across the cotton growing regions of south India. During initial stages, the volatiles emanating from the seedlings attract this stem weevil. Studies on influence of plant and insect derived volatiles on behaviour of stem weevil in cotton were meagre. So far there is no work on semiochemicals pertaining to cotton stem weevil. The work on pheromones /attractive plant volatiles for coconut rhinoceros beetle, sweet potato weevil, red palm weevil, banana pseudo stem borer and other economically important weevils represents a powerful tool for early detection of infestations. Monitoring and control strategies based on aggregation pheromones and their synergistic enhancement by host-plant volatiles has been used extensively in lepidopteron insects. Similarly, aggregation pheromone is an important component of the boll weevil eradication programme in the United States. The aggregation pheromones of several weevil species consist of multiple behaviourally active components. Hence, behavioral manipulation through interspecific (plant derived) and intraspecific (Insect derived) volatiles are the two viable options which will be explored in our project for effective management of stem weevil under field condition.



Extraction of semiochemicals from host plant and insect pest



Characterization of semiochemicals from host plant and insect pest



Identification of potential attractance / deterrent & Development of semiochemical based attractant for stem weevil management



Evaluation of extracts for attractancy and repellency against stem weevil through Y tube and multi arm olfactometer

ICAR-CICR Celebrates Foundation Day

ICAR-Central Institute for Cotton Research (CICR), Nagpur celebrated its 46th Foundation day on 1st April 2022 in the presence of Dr. C. D. Mayee, Ex-Chairman (ASRB) & Ex-Director (ICAR-CICR), Dr. Velchala Praveen Rao, Hon'ble Vice Chancellor, PJTSAU, Telangana, Dr. B. S. Dwivedi, Director, ICAR-NBSS&LUP, Nagpur and Dr. D. K. Ghosh, Director, ICAR-CCRI, Nagpur. Dr. Y. G. Prasad, Director, ICAR-CICR in his welcome address mentioned that genome editing, transgenic cotton and precision agriculture are major thrust areas of future research in cotton and briefed the achievements of the institute. It is a matter of pride that CICR released 10 cotton varieties during 2021-22, out of which, four are Bt varieties for the Central and Southern states. For the first time, a naturally coloured cotton variety (dark brown linted) was released for cultivation in South zone. Two Extra-long staple (ELS) cotton varieties (> 32.5 mm fibre length) which are superior in yield to the landmark variety 'Suvin' have been released to boost the production of the much needed ELS cotton so as to meet the requirement. Three non Bt American cotton varieties and one desi cotton variety have been released for adoption under organic cotton cultivation in Central and Southern states. CICR is in the process of initiating work on cotton value chain for desi/organic kapas in partnership with stakeholders in Maharashtra. Dr. Mayee, in his address as Guest of Honour emphasized the role of CICR in pink bollworm management by mating disruption technique and also appreciated Institute's efforts towards the welfare of cotton farming community. Dr. Praveen Rao, Hon'ble Vice Chancellor, PJTSAU, Telangana, in his foundation day lecture as Chief Guest spoke about the promotion of High Density Planting System (HDPS) in Cotton as a key for enhancing cotton productivity and resource use efficiency. He stated that this method helps in tackling pink boll worm menace in cotton due to early maturity of crop within 150 days. He also stressed that location specific canopy management and defoliants aid in upscaling of HDPS towards mechanisation of cotton cultivation and harvesting. A journey of ICAR-CICR since its inception (1976) was presented by the Director. Institute publications "CICR at a Glance" and "CICR Technologies" were also released by the dignitaries during the occasion. Dr. Mayee inaugurated an Automatic weather station for providing value added agromet advisories to farmers in Nagpur district. The staff of all categories who retired from ICAR-CICR were felicitated in honour of their significant contributions. The meeting concluded with the vote of thanks proposed by Dr. Nandini GokteNarkhedkar.



Dr. C. D. Mayee, Ex-Chairman (ASRB), Dr. B. S. Dwivedi, Director, ICAR-NBSS&LUP, Nagpur and Dr. D.K. Ghosh, Director, ICAR-CCRI, Nagpur along with Dr. Y. G. Prasad, Director, ICAR-CICR, Nagpur and Dr. Nandini GokteNarkhedkar on the dias during the inauguration of ICAR-CICR 46th Foundation Day



Release of the Institute Publication, CICR At a Glance and CICR Technologies developed at the hands of Dr. C. D. Mayee, Ex-Chairman (ASRB). Other dignitaries present include Dr. B. S. Dwivedi, Director, ICAR-NBSS&LUP, Nagpur and Dr. D.K. Ghosh, Director, ICAR-CCRI, Nagpur; Dr. Y. G. Prasad, Director, Dr. D. Blaise, Head, Crop Production and Dr. Nandini Gokte Narkhedkar, Head, Crop Protection, ICAR-CICR, Nagpur

Annual Group Meeting of AICRP on cotton held during April 6-8, 2022

The annual group meeting of All India Coordinated Research Project on Cotton along with fifty years of Cotton Hybrid Technology was held in hybrid mode during April 6 to 8, 2022 organised by ICAR-AICRP on Cotton, ISCI, Mumbai and TNAU. Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) participated virtually and delivered the presidential address. Dr. S. A. Patil, Chairman (RAC) for ICAR-CICR, Nagpur, Sh. Suresh Kotak, Chairman, Kotak & Co., Mumbai participated virtually in the Inaugural session. Dr. T.R. Sharma, DDG (Crop Science), Dr V. Geethalakshmi, Hon'ble Vice Chancellor, TNAU, Dr. R. K. Singh, ADG (Commercial Crops), Dr. C. D. Mayee, Chairman, Programme Advisory & Monitoring Committee of AICRP on Cotton, Dr. Y. G. Prasad, Director ICAR-CICR, Nagpur, Dr. (Mrs) Sujata Saxena, Director, CIRCOT, Mumbai, Dr Hema Prabha, Director, ICAR-SBI, Coimbatore, and Dr. A.H. Prakash, Project Coordinator, AICRP on Cotton along with the members of Programme Advisory and Monitoring Committee of AICRP on Cotton, scientists from various public and private sector R & D institutes participated in the meeting.. The first day had five sessions with lectures delivered by many experts on cotton hybrid technology. On April 7- 8, 2022 AICRP meeting was held with seven technical sessions followed by valedictory. The results of various trials under Plant Breeding, Agronomy, Entomology, Pathology and Fibre quality were reviewed in detail. Further the technical programme for the forth coming year was also finalized. During the group meeting, the Variety Identification Committee meeting of both Bt Cotton Hybrids / Varieties and Non-Bt Cotton Hybrids / Varieties were also conducted under the chairmanship of Dr. R.K. Singh, ADG (CC).



Deputy Director General (Crop Science) visits ICAR- CICR, RS, Coimbatore

Dr. T.R. Sharma, Hon'ble Deputy Director General (Crop Science) and Dr. R K Singh, Assistant Director General (Commercial Crops) visited ICAR - Central Institute for Cotton Research, Regional Station, Coimbatore on April 7, 2021. During the visit DDG interacted with scientists and the scientists briefly presented their research activities and progress made during the year 2021-22. The demonstration fields with poly-mulch and drip fertigation, wireless smart traps for automated pest monitoring in cotton, drone spraying pesticides were observed by the dignitaries during the visit. The DDG (CS) inaugurated the newly constructed "Insect Screening Chamber" at the station.





Student visit:

Ninety-Six final year BSc Agri students from National College, College of Agriculture, Padannakkad visited ICAR-CICR, Regional Station on April 4, 2022. Dr S. Usha Rani (Agricultural Extension), Dr S. Manickam (Plant Breeding) interacted with students and highlighted the achievements of the Station. Field and laboratory visits were also arranged during the visit. Ninety third year and final year B.Sc. Agri students from School of Agricultural Sciences, Bharath Institute of Higher Education and Research (BIHER), Selaiyur, Chennai visited ICAR-CICR, Regional Station on April 27, 2022. Dr Gulsar Banu (Agricultural Nematology), Dr J. Annie Sheeba (Plant Physiology) interacted with students and briefly explained about the inception of the institute and significant achievements on various research areas of the Station.





Collaborative Masters Training Program organized at CICR, Nagpur

Five days 'Masters training program on recent advances and improved cotton production technologies' for the agricultural officials of Maharashtra was organized by city based premier institutes VANAMATI and ICAR-CICR at seminar hall, CICR, Nagpur during 25-29th April, 2022. This master training of trainer's program was formulated under the mentorship and guidance of Dr. Y. G. Prasad, Director, ICAR- CICR, Nagpur. At the outset, inauguration and opening of the training program was done by the hands of Dr. Y. G. Prasad. Sh. Uday Patil, Additional Director and Sh. Subodh Mohril from Vanamati graced the inaugural function. Ms. Sima Mundle worked as a course coordinator for whole session of the training program. She introduced the participants to the dignitaries and experts of training program. Dr. V. Chinna Babu Naik, Senior Scientist (Agricultural Entomology), Dr. Ramkrushna, G.I., and Dr. Dipak T. Nagrale, senior scientists from the institute acted as a local course coordinator for the training program. Dr. M. V. Venugopalan, Principal Scientist (Agronomy) & I/c PME cell welcomed the participants and briefed the course content and lecture series of subject experts prepared by CICR. In valedictory function, Dr. Prasad advocated the importance of such masters training program for the agricultural officials. He informed various research and extension activities being done by institute and strongly expressed his opinion that this training was very useful as step ahead to sensitize trainers about several cotton production technologies to enhance the production and productivity in Maharashtra. During the event, subject experts from the institute covered several topics including insect-pests, diseases, soil fertility and nutrition, water management, improved varieties etc. Thirty-two participants from different cotton growing zones of Maharashtra mainly benefitted from this training program.



ICAR-CICR organize workshop for organic cotton growers

One day Workshop on organic cotton production was organized at Sewagram on 23rd April 2022 by ICAR-CICR in collaboration with Gram Seva Mandal, Wardha and Mission Samruddhi, Chennai as part of 'Annadata Devo Bhava' campaign. Dr. Y. G. Prasad, Director, CICR highlighted the revival in demand for organic cotton and the need for establishing robust supply chain from production to marketing. Non-GM varieties developed and released by CICR will fill the gap in meeting the demand for varieties of suitable quality by organic growers in central and southern cotton growing zones. Geotagging, traceability and certification will help in boosting organic cotton production.



Dr. Dr. MV Venugopalan, Principal Scientist, ICAR-CICR, Nagpur, Mr. Atul Sharma Secretary, Gram Seva Mandal, Wardha, Dr. Vidya Mankar Project Director ATMA, Wardha, Mr Kishore Jagtap, program officer, Mission Samruddhi, Dr. Suhas Podar, Principal, Anand Niketan Agricultural College, Warora explained & guided the participating farmers on organic cotton production initiative. Dr. Sunil Mahajan, Principal Scientist (Seed Technology) provided detailed information to the farmers about the properties of non-GM varieties promoting for organic farming developed by CICR. Dr. Ramakrishna G. I. Senior Scientist provided guidance on soil testing and nutrient management in organic cotton production. Dr. Rachna Pandey provides information on pest management and Dr. V. Chinna Babu Naik explained about Trichogramma production technology to the farmers as an important biological method of pest management. Dr. Shailesh Gawande, Senior Scientist presented the alternatives for disease management in organic cotton production developed by CICR. The seeds of non-GM varieties along with Trichoderma packet for seed treatment were distributed to the farmers on this occasion. About 90 farmers from Yavatmal and Wardha districts participated in the workshop. Mr. Kishor Jagtap from mission Samrudhhi proposed the vote of thanks. The program was concluded with a prayer song in the Gram Gita. Dr. V. Chinna Babu Naik, Senior Scientist (Agricultural Entomology), Dr. Ramkrushna, G.I., and Dr. Shailesh Gawande, Senior Scientist (Plant Pathology) acted as a course coordinator for the training program.

Exposure visit of Agricultural graduates to ICAR-CICR- Nagpur

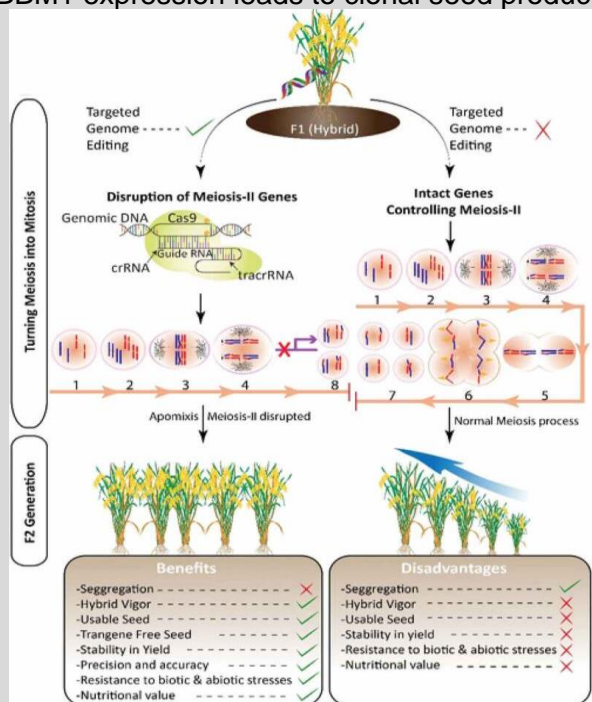
The final year students of College of Agriculture, Kalaburagi, UAS Raichur (KA) visited ICAR-CICR on 26th April 2022 as part of their course curriculum under All India Educational study tour programme. The students visited labs of the institute and were briefed about the different research activities by Dr. Vivek Shah (Insectary), Dr. Rakesh Kumar (Tissue culture lab), Dr. Pooja Verma (GC-MS and other instrumentation) and Dr. Chandrashekar N (Biotechnology and Bt referral lab). Dr. Neelakanth S. Hiremani (Member, HRD Cell) coordinated the students' visit.



Did You Know?

Sustaining hybrid vigour over several generations?

Most farmers cultivate hybrid cotton in India because of the higher vigour obtained in F₁. The only way to fix this hybrid vigour is through obtaining apomictic seeds. The induction of apomixis is made easier by the advancement of genome editing techniques. Through the CRISPR/Cas genome editing system, disruption of the expression of egg cell MATRILINEAL (*MTL*) genes encourages the production of haploid seed, whereas knockout of three genes namely Baby Boom (*BBM*) genes *BBM1*, *BBM2*, and *BBM3* causes embryo arrest and abortion. Genome editing of *BBM1* expression leads to clonal seed production and heritability for multiple generations.



Reference:

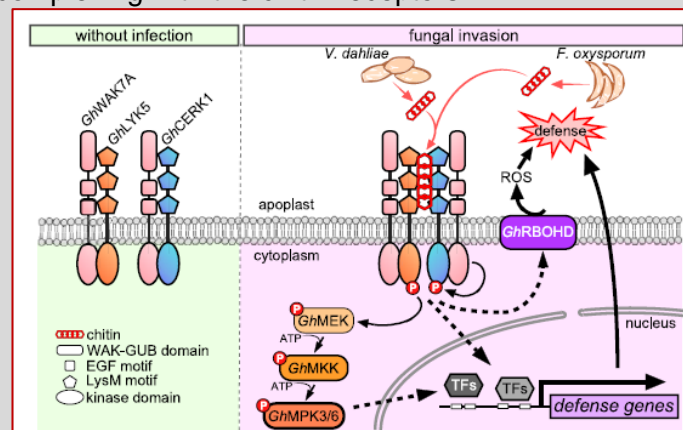
- Sajid Fiaz, Xiukang Wang, Afifa Younas, Badr Alharthi, Adeel Riaz & Habib Ali (2021) Apomixis and strategies to induce apomixis to preserve hybrid vigor for multiple generations, *GM Crops & Food*. 12:1, 57-70, DOI: 10.1080/21645698.2020.1808423

Contributed by: Dr. K. Baghyalakshmi, Scientist, Plant Breeding and Genetics, ICAR-CICR, RS-CBE.

Recent Advances in Plant pathology

GhWAK7A- The Cotton Wall-Associated Kinase Mediates Responses to Fungal Wilt Pathogens

Plant receptor-like kinases (RLKs) are proteins with a predicted signal sequence, single transmembrane region and cytoplasmic kinase domain. Plant receptor-like kinases (RLKs) are important players in response to pathogen infections. Verticillium and Fusarium wilts, caused by *Verticillium dahliae* (Vd) and *Fusarium oxysporum* f. sp. *vasinfectum* (Fov) are among the most devastating diseases in cotton. In order to understand the host response to these soil-borne fungal pathogens, the research team performed a genome-wide in silico characterization and functional screen of diverse RLKs for their involvement in cotton wilt diseases. In turn they identified *Gossypium hirsutum* GhWAK7A, a wall-associated kinase, that positively regulates cotton response to both Vd and Fov infections. A conserved chitin sensing and signaling system is present in cotton, including chitin-induced GhLYK5-GhCERK1 dimerization and phosphorylation which contributes to cotton defense against Vd and Fov. Importantly, GhWAK7A directly interacts with both GhLYK5 and GhCERK1 and promotes chitin-induced GhLYK5-GhCERK1 dimerization. Thus, it reveals GhWAK7A as an important component in cotton response to fungal wilt pathogens by complexing with the chitin receptors.



A Proposed Model for GhWAK7A-Mediated Chitin Signaling in Cotton Defense against Fungal Pathogens (Image source: Wang et al., 2020)

References:

- Wang, P., Zhou, L., Jamieson, P., Zhang, L., Zhao, Z., Babiloni, K., Shao, W., Wu, L., Mustafa, R., Amin, I., Diomaiuti, A., Pontiggia, D., Ferrari, S., Hou, Y., Ping, H. and Shana, L. 2020. The Cotton Wall-Associated Kinase GhWAK7A Mediates Responses to Fungal Wilt Pathogens by Complexing with the Chitin Sensory Receptors. *The Plant Cell*, 32: 3978-4001.

Contributed by: P. Valarmathi, Scientist (Plant Pathology), ICAR- CICR, Regional Station, Coimbatore-641 003

Farmer's Corner

Insecticide Resistance Management (IRM) strategies in cotton – a farmer Shri. P. Mayisamy who adopts IRM from Sattakkalpudur shares his success story

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 as a part of extension program. Fifty farmers from Palanigoundanur, Muthugoundanur, Sokkanur, Veerappagoundanur, Sattakkalpudur villages were adopted for the implementation of project activities during the current season. Training was imparted to farmers on plant protection technologies through lectures, field demonstrations, group meetings and exhibitions. Also they are being trained on pest monitoring with pheromone traps, use of bio-control agents and safe handling of insecticides. Regular monitoring of fields was done for sucking pests, natural enemies and boll damage at weekly intervals. Critical inputs were given and the farmers are advised to follow the plant protection measures.

Shri. P. Mayilsamy (Mobile No: 9965332843), an adopted farmer from the Sattakkalpudur village cultivating sole cotton actively participated in the training programmes organized under IRM project. After receiving the training, the farmer started adopting the use of pheromone traps for pest monitoring; was able to identify the damage symptoms and learned the concept of economic threshold level (ETL) in deciding the timing of insecticide spray. He used to get an annual income of Rs. 96,296/- from cotton. He faced problems like pest and diseases, non availability of labour, water scarcity increase in critical input price etc. With DFI interventions like supply of critical inputs like insecticides, growth regulators, fertilizers, better cultivation practices, drought management techniques etc. he is getting an annual income of Rs. 1,63,925/- with a benefit cost ratio of 1.85. There was 65.32 % reduction in pesticide usage by following IRM strategies.

*Information provided by
Dr. K. Rameash, Principal Scientist,
Agrl. Entomology, ICAR, RS,
Coimbatore -3*

Scientists' Corner:

- ICAR-CICR Celebrated 46th Foundation day on 01st April 2022 in hybrid Mode. Dr. Praveen Rao Vice Chancellor, PJTSAU participated as Chief Guest. Dr C D Mayee, Former Chairman, ASRB, Dr B S Dwivedi, Director, ICAR-NBSS & LUP and Dr D K Ghosh, Director, ICAR-CCRI Nagpur participated as Guests of Honour.
- Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur along with Price Fixing Committee Members participated in the Price Fixation Committee meeting held on 04th April 2022 through virtual mode.
- Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur along with scientists involved in genome editing research participated in the virtual interaction regarding "Information on status of ongoing genome editing research in field and horticultural crops" being organized by ICAR Secretary, DARE and DG, ICAR on 06th April 2022.
- Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur participated in the the Fifty years (Golden Jubilee) Celebration of Cotton Hybrid Technology on 6th April, 2022 jointly hosted by ICAR-AICRP Project on Cotton, Coimbatore and ISCI, Mumbai.
- Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur along with concerned scientists attended the varietal identification committee meeting for Bt cotton variety/ Hybrid under the Chairmanship of Dr. R.K. Singh, ADG (CC), ICAR, New Delhi on 7th April, 2022 in hybrid mode.
- Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur along with concerned scientists participated in the ICAR-All India Coordinated Research Project on Cotton Annual Group Meeting on 07th & 08th April, 2022 at Tamil Nadu Agricultural University, Coimbatore.
- Dr. Y.G. Prasad, Director ICAR-CICR, Nagpur participated as Panelist in the Session III "Next Revolution in Cotton Farming" in the CITI-CDRA Golden Jubilee Celebrations & Mega event in the Vigyan Bhawan, New Delhi on 12th April 2022 organized by Confederation of Indian Textile Industry. The Theme of the Mega Event was "Kapas Ki Adhik Upaj, Shudh Upaj".
- Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur, attended the annual conference of ICAR Directors held on 13th April, 2022 in C Subramanian Auditorium, NASC, PUSA, New Delhi.
- On behalf of the Kamgar Kalyan Mandal, ICAR- Central Institute for Cotton Research paid homage to Dr. Babasaheb Ambedkar on **14.04.2022** at **10.30** am in the reception hall of the office building on the occasion of Dr. Babasaheb Ambedkar Jayanti. The chairman of the committee, Dr. Y.G. Prasad, Director, ICAR-CICR, Heads of the various divisions and the members were present.
- Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur along with Dr. V.N. Waghmare attended the zoom meeting regarding CCPI of the project for discussion during the cost committee on 20th April, 2022 organized by ADG (NASF), ICAR, New Delhi.
- Dr.Y.G. Prasad, Dr.V.N. Waghmare, Dr. M.V. Venugopalan and Dr. A.H. Prakash attended meeting with the officials of Bayer Crop Science on 22nd April 2022 to discuss the proposal for trait introgression (TI) of RRF into BGII lines to be provided with companies licensed to Bayer Crop Science.
- Dr. Y.G Prasad, Director ICAR-CICR, Nagpur delivered the special guest address in Kisan Mela and Kisan Bhagidari Prathmikta Hamari Abhiyan on 22nd April, 2022 being organized by KVK, ICAR-CICR Nagpur in Commemoration of 75th Year of India Independence (Azadi ka Amrut Mahotsav).
- Dr.Y.G Prasad, Director ICAR-CICR, Nagpur inaugurated the "Masters' Trainers on Cotton" training programme being jointly organised by Vanamati, Nagpur and ICAR-CICR Nagpur during 25th to 27th April, 2022 at ICAR-CICR, Nagpur.
- Dr. Y.G. Prasad, Director, ICAR-CICR, Nagpur was nominated as member of UGC Expert Committee to assess the Higher Educational Institutions (HEI) – Kerala Veterinary & Animal Sciences University, Kerala. He held discussions with its major stakeholders and made assessment of its academic viability and infrastructure facilities adhering to the provisions as enunciated in the guidelines during 27th-30th April 2022.
- Dr. V. Chinna Babu Naik, Sr. Scientist (Ag. Entomology) and Dr. Dipak T. Nagrale, Sr. Scientist (Plant Pathology) delivered an interactive lecture on "Management of Pink bollworm in Cotton" and "Integrated boll rot disease complex management in cotton" during Five days 'Masters training program on recent advances and improved cotton production technologies" for the agricultural officials of Maharashtra was organized by city based premier institutes VANAMATI and ICAR-CICR from 25-29 April, 2022.
- Dr. V. Chinna Babu Naik, Sr. Scientist (Ag. Entomology) delivered an interactive lecture on "Biocontrol agents for Management of Pink bollworm" during One day Workshop on organic cotton production was organized at Sewagram on 23rd April 2022
- Dr. A. Manikandan, (Scientist, Soil Science) delivered a talk on "Biofertilizer formulation from agricultural waste and crop improvement through Biotechnology" at Department of Biotechnology and Environment Science, Kamala Nehru College, Nagpur on 8th May 2022.
- Dr. A. Manikandan (Scientist, Soil Science), delivered a lecture on soil health management in the training programme on 'Master Trainers training for cotton crop' at Vasantrao Naik State Agricultural Extension Management Training Institute (VANAMATI), Nagpur on 25th April 2022.
- Dr. A. Manikandan, Scientist (Soil Science) delivered a lecture on "Foliar Nutrition Management and ways to improve biofortification" at farmers level to reduce malnutrition. For the "Nationwide campaign on "Biofortification, Nutrient Grooms and Crop diversification". To create massive awareness and wider publicity, the outreach of the said campaign is carried out at ICAR-Central Institute for Cotton Research, Nagpur on 28th April, 2022
- Dr. A. Manikandan (Scientist, Soil Science), conducted a week long training (16th -21st April, 2022) on 'Soil and Plant Analysis' for the staff of Krishi Vigyan Kendra, ICAR-CICR Nagpur.

Cotton scenario during April 2022

A. R.Reddy and Isabella Agarwal

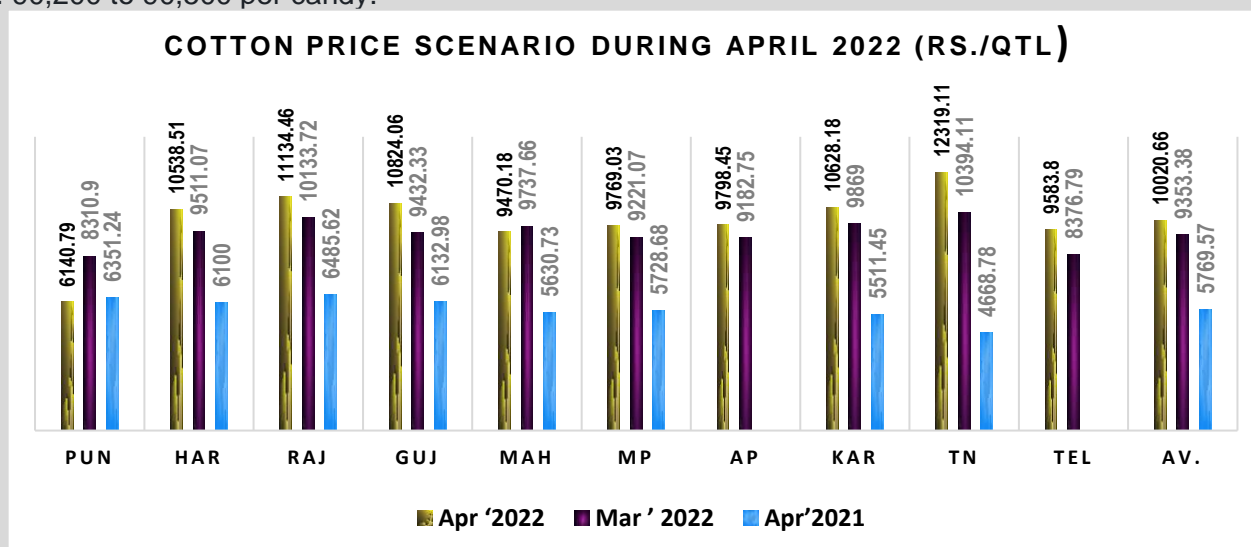
Global cotton prices surged since last month with A-Index rising over 20 cents per pound to 154 cents and nearly 70 cents above the same period last year. Despite the ongoing conflict in Ukraine, prices on the Intercontinental Exchange have witnessed an exuberant rally.

2022	A-Index	US	China	India	Brazil
Mar	133.2	114.8	162.8	127	137.6
April	154	132.1	162.9	153.7	151.7
Change (%)	20.8	17.3	0.1	26.7	14.1

Contrary to price movements across the world, spot prices in China were unchanged. High lint prices and its large cotton yarn and fabric stocks are both helping to suppress cotton lint demand. The A-Index is roughly 10 cents lower than domestic prices in China compared to roughly 30 cents last month, signaling that China's price gap has narrowed dramatically. This is expected to slow China's short-term foreign purchases despite the recent issuance of sliding scale quota. Indian cotton market remained firm during April.



The arrivals were highest in Haryana, Gujarat, Maharashtra, MP and Telangana when compared to the other States where the produce was immediately marketed prior to skyrocketed price. All India daily arrivals are decreasing rapidly and tight supply helped prices stay strong in the Indian market. Indian mills are struggling to get quality cotton. Also, disparity in yarn forced them to cut down production of yarn. Indian cotton Shanker-6 prices remained stable near Rs. 90,200 to 90,500 per candy.



There was exorbitant rise in cotton prices during April 2022 in the States of Gujarat, Tamil Nadu and Telangana to the tune of 14 to 18 per cent compared to previous month. Cotton prices continued their upward trend that began in early May 2020 to reach an 11-year high in March.

CICR's welfare activities for cotton farmers lauded

ICAR-Central Institute for Cotton Research (ICAR-CICR), Nagpur, celebrated its 46th foundation day on April 1, where the dignitaries lauded the institute's various progressive and welfare activities for cotton farmers. The event was held in the presence of CD Mayee, ex-chairman (ASRB) and ex-director (ICAR-CICR), Velchala Praveen Rao, vice-chancellor, PTJSAU, Telangana, BS Divedi, director, ICAR-NBSS&LUP, Nagpur and DK Ghosh, director, ICAR-CRI, Nagpur. YG Prasad, director of ICAR-CICR said that ICAR released 10 cotton varieties during 2021-22, out of which, 4 are Bt varieties for the central and southern states. Mayee emphasized the role of CICR in pink bollworm management and appreciated institute's efforts towards the welfare of cotton farming community. VP Rao, in his foundation day lecture as chief guest spoke on promotion of high density planting system in cotton as key for enhancing productivity. Mayee inaugurated an automatic weather station for providing value added agromet advisories to farmers in Nagpur district. The staff of all categories who retired from ICAR-CICR were felicitated for their significant contribution. Vote of thanks was proposed by Nandini Gokte Narkhedkar.



Times of India, 05.04.2022

ICAR-CICR holds training programme on 'Scientific Goat Farming'

Staff Reporter

ICAR-Central Institute of Cotton Research (ICAR-CICR) conducted a three-day training programme on 'Scientific Goat Farming' at KrishiVigyan Kendra recently. This training was conducted under 'Capacity building of farmers through training programmes on profitable dairy farming and livestock management scheme. Fisheries, Animal Husbandry and Dairying Ministry sponsored the training programme. Total 40 participants from Nagpur district participated in the training. Guidance regarding establishment of goat farming to marketing was given by experts. This event was held under the guidance of Dr Y G Prasad, Director, ICAR-CICR, Nagpur.



In the valedictory function, Dr C D Mayee was the chief guest. Dr Mayee urged participants to come together to form an FPO and said goat farming is an excellent, sustainable, supplementary business which plays an important role in doubling farmer's income. Dr S N Rokde, Principle Scientist (Livestock Production and Management) and Head, KVK delivered lecture on 'Scientific goat farming'. The course co-ordinator Dr Ulhas Nandankar, Dr Subhash Patil, Sanita Chaulhan, Dr Deepa Lal and Dr Deulkar extended support to conduct the programme.

The Hitavada, 06.04.2022

Textile prices said to surge as cotton cost soars

'Cotton prices rose 58%, yarn by 33%

M. SOUNDARYA PREETHA COMBATOR

With cotton prices spiralling to more than ₹90,000 a candy, prices of cotton textile products are expected to surge, according to industry officials.



In Tiruppur, manufacturers of basic garments raised prices by 15% in December and were likely to go in for another price revision shortly. "Cotton prices are going up almost on a daily basis. But, garment manufacturers cannot do so. Now, there is no option but to raise the prices again," said an industry source.

Industry sources point out while cotton prices rose 58%-60% between last October and this month, yarn prices had gone up by 33%.

Raja M. Shammugham, president of Tiruppur Exporters' Association, said that between October 2021 and April 2022, cost of cotton-based garments in-

creased 15%. "Overseas customers are not willing to offer any further hike in prices as they had already increased the prices earlier," he said. Industry sources point out while cotton prices rose 58%-60% between last October and this month, yarn prices had gone up by 33%.

The Hindu, 06.04.2022

शाश्वत उत्पन्नासाठी शेळीपालन राजमार्गच!

३००००० मधील शेळीपालन
३००००० मधील शेळीपालन
३००००० मधील शेळीपालन



करी भंडारणात उत्तम शेळीपालन
करी भंडारणात उत्तम शेळीपालन
करी भंडारणात उत्तम शेळीपालन

Tarun Bharat, 06.04.2022

सीआयसीआर कापसाची मूल्यसाखळी विकसित करू

केंद्रीय कापूस संशोधन संस्थेचे संचालक डॉ. प्रसाद यांची माहिती
केंद्रीय कापूस संशोधन संस्थेचे संचालक डॉ. प्रसाद यांची माहिती
केंद्रीय कापूस संशोधन संस्थेचे संचालक डॉ. प्रसाद यांची माहिती



Sakal Agroone, 03.04.2022

शेतकऱ्यांपर्यंत कापसाचे प्रगत तंत्रज्ञान पोहोचवा

संचालक डॉ. प्रसाद यांचे आवाहन ; मास्टर ट्रेनरसाठी प्रशिक्षण अधीन वृत्तवारी
संचालक डॉ. प्रसाद यांचे आवाहन ; मास्टर ट्रेनरसाठी प्रशिक्षण अधीन वृत्तवारी
संचालक डॉ. प्रसाद यांचे आवाहन ; मास्टर ट्रेनरसाठी प्रशिक्षण अधीन वृत्तवारी



Cotton hits ₹13k/quintal, some gain, some miss

Shikhar Agrains/Instagram.com
Nagpur: These days, cotton rates are continuing to match the Seneca. Soon after the harvest, cotton rates touched Rs 10,000 a quintal. The rally has continued with raw cotton now fetching over Rs 13,000 a quintal in certain pockets of the region. Earlier, it was barely around the minimum support price of Rs 9,000/qr.
The average price now is in the range of Rs 12,000 to 13,000. The current levels are more than what the farmers had even dreamt of. Now as prices of the main crop of Vidarbha reach a new high, farmers PTJ talked to said they are already sold off their produce when the rates were in the range of Rs 8,000 to 9,000 a quintal.
The high prices earlier came as a surprise because the output was low and it was only because of export demand that they were saved from losses. The farmers, too, may not enjoy the benefit of cotton touching Rs 12,000 to 13,000. Traders on the other hand, said farmers too have become traders since they have the cash/croppers, though handful of them, who are bringing the produce in the market and not traders. They had held on to the stock waiting.



WHITE GOLD

desires as it made out of cotton seeds. As there is a shortage, India has become a source of cotton to the world. From Sindh, a trader in Wardha said the rate in the 'Belt' of the district are the highest. Cotton is being purchased for as much as Rs 12,500 to Rs 13,000 a quintal. It's the farmers who had held on to the stock and are now bringing the produce. In April and as much as 200 vehicles are reaching the city. This has also made a little fodder available by Rs 1,000 a quintal to Rs 1,400 to Rs 1,500 a quintal.
Farmers on the hand say they have already sold the crop in stock not leaving much to profit. Nita Rishab in the village of Yavatmal said almost everyone in his village had sold off the cotton, except one. The person who hasn't sold had a Central government job and could not find time to reach the market.
Dajanan Singwar from Patin village at Maharashtra's Jalgaon district also said he had sold when the rates were around Rs 10,000 a quintal.
Sudhir Kothari, a director at the APMC in Hingurajpur, said he is certain the farmers though they may be bringing the produce in the market, it is not their own. It is a major by-product of the cotton crop.

Times of India, 06.04.2022

कापूस लागवड-व्यवस्थापन तंत्रज्ञानावर आज मंथन

राज्यभरतील २०० शेतकरी, सेवा क्षेत्रातील भागाधारकांचा समावेश
राज्यभरतील २०० शेतकरी, सेवा क्षेत्रातील भागाधारकांचा समावेश
राज्यभरतील २०० शेतकरी, सेवा क्षेत्रातील भागाधारकांचा समावेश



9 May, 2022, Sakal Agroone

350 farmers benefit from cotton workshop

Times News Network
Nagpur: ICAR-Central Institute for Cotton Research (ICAR-CICR), organized a 'Stakeholders Interface workshop - Pro-kharif' consultation on technologies and best practices for enhancing cotton productivity at Vanaman on Saturday.
The event was held in association with PKV, Akola and department of agriculture, Nagpur Division. More than 350 farmers from villages of Nagpur, Wardha, Amravati, Akola, Unred, Chandrapur and Gadchiroli benefited from the workshop.
State minister for animal husbandry Sunil Kedar was the chief guest. Dr CD Mayee, ex-chairman (ASRB) and ex-director (ICAR-CICR), Dr VM Bhalhe, vice-chancellor of PKV, Dr AI Waghmare, director of DCD and Ravindra Bhosle, JDA, Nagpur division, were the dignitaries who shared the dais.
Kedar emphasized the need of good extension so as to take respo-



Minister Sunil Kedar was the chief guest of ICAR-CICR workshop

9 May, 2022, Times of India

सॅन्ड्रिय मालाच्या मागाणीत वाढ

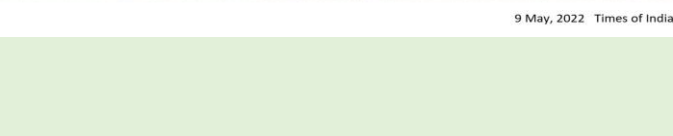
डॉ. प्रसाद: 'अजदात देवो भव' या मोहिमेअंतर्गत कार्यशाळा
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वर्षा: केंद्रीय कापूस संशोधन संस्थेच्या वतीने काही आसराकीय संस्थांना सकारणादील कापूस लागवडीला जागरूक बनवण्यात येणारे आहे, याबाबतचे अजिंक्यपारितोषा उपस्थित संचालक डॉ. याच. जी. प्रसाद, विद्या नागपूर.

This 'rakhi' keeps pink bollworm at bay

'Bandhan' Improves Cotton Yield
Sarfana Ahmed/Instagram.com
Nagpur: Cotton grower Anshu Mohite from Adash village in Kalamnsingh taluka didn't use any spray to protect his crop from pink bollworm last kharif season. Despite other suffering heavy crop damage due to the pest in 2020, the farmer managed to get a farm came after he switched to Japanese technology from PTJ knots - a small white filled with lures - to prevent pest attack. Under project Bandhan, over 100 PF knots, as mating disruptors, per acre were used to save 10-15% of the crop. The farmer said he had saved 10-15% of the crop. The farmer said he had saved 10-15% of the crop.



9 May, 2022 Times of India

यशोगाथांमधून अंशोवनने जागविला नवा आशावाद

वर्षानिर्दान कार्यक्रमात तज्ञांच्या चर्चासत्रातील पूर
वर्षानिर्दान कार्यक्रमात तज्ञांच्या चर्चासत्रातील पूर
वर्षानिर्दान कार्यक्रमात तज्ञांच्या चर्चासत्रातील पूर



वर्षानिर्दान कार्यक्रमात तज्ञांच्या चर्चासत्रातील पूर

Click of the Month



Ectoparasitic mite, *Bochartia* sp. feeding on the first instar nymph of jassid.

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



Produced and published by

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

Chief Editor:

Dr. Y. G. Prasad

Senior Editor:

Dr. Annie Sheeba

Associate Editor, Cover page & Layout Design:

Dr. M. Sabesh

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

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

Published by

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

Citation: Cotton Innovate 2022, ICAR-Central Institute for Cotton Research, Nagpur, India, Volume: 04 (02), pp-15, available at http://www.cicr.org.in/cotton_innovate.htm

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