

11.3 : Consultancy, Patents, Commercialization of Technology

Patents granted

| S. No. | Title | Patent granted no. | Name of Inventor |
|--------|---------------------------------|--------------------|-------------------|
| 1. | Rapid detection of Bt Cry toxin | No. PA/A2004/01179 | Dr. K. R. Kranthi |

Patents filed

Complete Applications submitted for Patent of Technologies

| S. No. | Title | Provisional Application No. allotted by the Patent Office | Complete application submitted and No. allotted by the Patent Office | Name of Inventor |
|--------|--|---|--|--|
| 1. | Propagation of diploid cotton <i>Gossypium arboreum</i> by multiple shoot induction | 1557/MUM/2009 | E - 2/508/2010-MUM Pages:-5, Claims:- 8 | Dr. S. B. Nandeshwar, Principal Scientist, CICR, Nagpur |
| 2. | PCR detection Kit for <i>Xanthomonas axonopodis</i> pv. <i>Malvecearum</i> | 1558/MUM/2009 | E - 2/509/2010-MUM Pages:-6, Claims:- 5 | Dr. P. K. Chakrabarty, Principal Scientist & Head CICR, Nagpur |
| 3. | Bacterial biopesticidal formulation derived from Entopathogenic nematodes for management of sucking pests of crops | 1854/ MUM/2010 | -- | Dr. Nandini Gokte - Narkhedkar, Principal Scientist, CICR, Nagpur |

11.4 : Significant Decisions of RAC, IRC, IMC and other Important Meetings

1. Research Advisory Committee Meeting

The second meeting of Research Advisory Committee of the institute was held at CICR, Nagpur on May 19-20, 2010. Dr. S. S. Baghel, Ex.Vice Chancellor, Assam Agricultural University, Jorhat & Central Agricultural University, Imphal, Chairman of RAC presided over the meeting. Dr. K.C. Jain, ADG (CC), ICAR, Dr. S.K. Sharma, Ex. Project Director, Project Directorate of Cropping Systems Research, Modipuram, Dr. G.T. Gujar, Head, Division of Entomology, IARI, New Delhi and Dr. J. Kumar, Professor & Head, Deptt. of Plant Pathology, GB Pant University of Agriculture & Technology, Pantnagar, Members of RAC; Dr. K.R. Kranthi, Director, CICR, Nagpur, Dr. P.R. Bharambe, Head, Crop Improvement Division, Dr. P.K. Chakrabarty, Head, Crop Improvement Division, Dr. M.K. Meshram, Member Secretary RAC & I/c Head Crop Protection Division, CICR, Nagpur, Dr. N. Gopalakrishnan, Project Coordinator (AICCIP) and Head, CICR RS Coimbatore and Dr. D. Monga, Head, CICR Regional Station Sirsa (Haryana) attended the meeting.

Dr. K.R. Kranthi, Director, CICR, Nagpur welcomed the chairman and members of RAC. In his introductory remarks, Dr. Baghel, Chairman, RAC advised that CICR should undertake commercialization of genetic stock with specific traits. Dr. K.C. Jain, ADG (CC) emphasized that cotton Scientist must carry out focused research on specific objectives. Dr. S.K. Sharma advised that the technologies developed should have end use and stressed the need for development of good Bt varieties from the public sector. Dr. G.T.Gujar remarked that commercialization of technologies is easy and quick in the private companies as compared to public sector. Dr. J. Kumar informed the house that lately pesticide consumption in Bt cotton has again been showing upward trend and stressed the importance of studies on insecticide resistance development. The Member Secretary presented Action Taken Report on the

recommendations of the previous RAC meeting. Heads of Crop Improvement, Crop Protection and Crop Production Divisions, CICR, Nagpur, Project Coordinator (AICCIP) & Head CICR Regional Station Coimbatore and Head CICR Regional Sirsa also presented salient achievements of the respective Divisions/ Regional Stations. The presentations were followed by lively discussions. The meeting ended with a Vote of Thanks proposed by the Member Secretary.

2. Institute Research Council (IRC) Meeting

IRC meeting of CICR, Nagpur and CICR RS Sirsa was held on April 28-30, and May 21, 2010 at CICR Nagpur under the Chairmanship of Dr. K.R. Kranthi, Director, CICR Nagpur. The Chairman in his opening remarks requested the scientists to focus on the flagship programmes on discovery of new genes, gene constructs, gene markers, alleles, RNAi and GM crops and enhanced yields through 'high density planting system' (HDPS), etc. The Chairman desired that the number of projects should be trimmed based on priority. He further requested each scientist to come out with new original ideas to mitigate the present and emerging problems in cotton production.

All the Heads of the divisions/research station-Shri M.K. Meshram, Dr. P.R. Bharambe, Dr. P.K. Chakrabarty and Dr. D. Monga presented the significant research achievements of their respective division/Station. They also presented decision taken in the divisional/Station IRC meeting in relation to the project continuation/ merger/ closure etc. based on the priority.

Dr. V. S. Nagrare, Secretary IRC presented action taken report of the last IRC-2009 meeting. Dr. N. Gopalakrishnan, PC and Head RS, Coimbatore discussed the recommendations and action taken report of last RAC 2009. Shri M. K. Meshram presented the salient recommendations of Research Advisory Committee (RAC) meeting held on 19-20 May 2010. Each

research project was discussed thoroughly and decisions on project continuation, merger, termination and extending duration of existing project and approval of new projects were taken by IRC. The meeting was attended by all the Scientists of Nagpur and Sirsa. Dr. A.K. Mukherjee, Mr K. Velmourougane and Dr. V. N. Waghmare acted as Rapporteurs of the meeting.

Prior to the main IRC, each project was discussed at length in divisional pre-IRC meeting held in respective division viz., Crop Protection on April 19, 2010, Crop Production on April 23, 2010, Crop Improvement on April 24, 2010 and RS Sirsa on March 26-27, 2010. Dr. V. S. Nagrare, Secretary IRC and Shri K. Velmourougane, Jt. Secretary coordinated the IRC meeting.

The Institute Research Committee (IRC) meeting of CICR, Regional Station, Coimbatore was held on July 7-9, 2010 at CICR, Regional Station (RS), Coimbatore under the Chairmanship of Dr. K.R. Kranthi, Director, CICR Nagpur. Dr. V.S. Nagrare, Secretary IRC welcomed Dr. K.R. Kranthi, Director, CICR Nagpur and Chairman IRC and all the Scientists.

Dr. N. Gopalakrishnan, PC and Head RS, Coimbatore presented the overall progress of the Regional Station and plan of action for the ensuing crop season 2010-11. Action taken report of the last IRC meeting held on February 10-11, 2010 in respect of CICR, RS, Coimbatore was presented by Dr. V.S. Nagrare. The IRC confirmed the minutes of last IRC meeting held on 10-11 February 2010. The institutes as well as externally funded projects presented by each scientist were critically reviewed by the IRC. The meeting was attended by Dr P. R. Bharambe, Head Division of Crop Production, Dr P. K. Chakrabarty, Head Division of Crop Improvement, Dr D. Monga, Head CICR RS Sirsa, Dr N. Gopalakrishnan, PC & Head CICR RS Coimbatore, Dr M. V. Venugopalan, Principal Scientist & In charge RCM Unit, CICR Nagpur and all the Scientists of Regional Station, Coimbatore.

3. Institute Management Committee Meeting

The 48th Meeting of Institute Management Committee of CICR, Nagpur was held on 27 April, 2010 at CICR, Nagpur under the Chairmanship of Dr. K. R. Kranthi, Director, CICR, Nagpur. The following Committee Members were present during the meeting:

1. Dr. O.P. Tuteja, Principal Scientist, CICR-RS, Sirsa - Member
2. Dr. K.N. Gururajan, Principal Scientist, CICR-RS, Coimbatore -Member
3. Dr. (Mrs.) Sandhya Kranthi, Senior Scientist, CICR, Nagpur -Member
4. Dr. (Mrs.) Vinita Gotmare, Senior Scientist, CICR, Nagpur -Member
5. Dr. N. Gopalakrishnan, PC & Head, CICR-RS, Coimbatore - Spl. Invitee
6. Dr. D. Monga, Head, CICR-RS, Sirsa - Spl. Invitee
7. Dr. P.R. Bharambe, Head, Division of Crop Production, CICR, Nagpur - Spl. Invitee
8. Dr. P.K. Chakrabarty, Head, Division of Crop Improvement, CICR, Nagpur - Spl. Invitee
9. Dr. M. K. Meshram, I/c Head, Division of Crop Protection, CICR, Nagpur - Spl. Invitee
10. Smt. Banu Narayanan, I/c F & AO, CICR, Nagpur - Spl. Invitee
11. Shri. M.S. Murthy, Administrative Officer, CICR, Nagpur - Member Secretary

The following are the major recommendations of the committee:

1. Taking into consideration of the fact that the availability of fibre quality evaluation unit in the premises of CICR-RS, Coimbatore will help the station in timely evaluation of the fibre samples of the experiments conducted at the regional station and AICRP on Cotton Centers. The committee recommended for accommodating "CIRCOT Fiber Evaluation Unit" in the un-occupied one Type-IV quarter at CICR-RS, Coimbatore.
2. The Committee strongly recommended to replace the old and rusted barbed wire fencing in the CICR, Nagpur farm boundary about 5,000 running meters length to protect the experimental fields and also to guard the property from encroachment.
3. The Committee recommends to renovate the Director's Chamber/Committee Room/Reception at CICR, Nagpur on priority basis during the financial year 2010-11, by meeting the expenditure from the funds available under the Head Furniture & Fixtures in XIth Plan EFC Document.
4. Taking into consideration of the fact that the institute is in the dire necessity of the Training Hall to cater to the needs and its activities, the Committee strongly recommends to provide additional funds amounting to Rs. 25.00 lakhs by (a) surrendering the civil work first floor construction for laboratory on the existing main building at CICR-RS, Coimbatore amounting Rs. 10 lakhs and (b) utilization of additional amount of Rs. 15 lakhs revenue generated under the AICCIP Bt Testing Fee. The Committee also advised the Institute to make all out efforts to take up construction of the Training Hall at the Institute at the earliest.

The meeting ended with thanks to Chair and the Members by the Member Secretary.

4. 21st Meeting of ICAR Regional Committee No. VII

The 21st ICAR Regional Committee Meeting for the Region-VII was inaugurated on December 2, 2010 at Central Institute of Agricultural Engineering, Bhopal by the Minister of Farmer Welfare and Agriculture Development, Govt. of Madhya Pradesh, Hon'ble Dr Ramkrishna Kusmariya. Vice Chancellors of State Agricultural Universities located in Region VII i.e. Madhya Pradesh, Chhattisgarh, Maharashtra and Goa, DDGs of ICAR, higher officials of the State Agricultural Universities were present on this occasion. The inaugural function was presided over by Dr S. Ayyappan, Secretary, DARE & Director-General, ICAR.

Dr Pitam Chandra, Director, Central Institute of Agricultural Engineering welcomed the Chief Guest and all the distinguished guests present on the occasion and informed that the growth in agricultural sector has increased to more than 6% and agricultural machines have played an important role in this rise. At the outset, DDG (Engg), ICAR Dr M.M. Pandey gave a brief outline of the proceedings of the meetings of the Regional Committee No. VII held earlier. He requested the representatives of the MP Government to actively participate in the present meeting and put forth their various problems related to agriculture.

Addressing the gathering on this occasion, Secretary, DARE & Director-General, ICAR, Dr S Ayyappan underlined the need of enhancing organic farming in the Region. He told that in the four states of the Region, the cultivated area is about 25% of the total area available for agriculture, whereas the agriculture

production is just approximately 15% of the national output. There are good opportunities for enhancing the production of sorghum, soybean and other coarse cereals in the region. He told that by controlling weed infestation, the agricultural production can be enhanced by 15 to 30%. He also stressed the need for efficient agricultural input utilization with special emphasis on processing equipment.

While addressing the gathering, the Chief Guest of the function, Dr Ramkrishna Kusmaria exhorted to reestablish the old practices of agriculture and disseminating the results on their research and importance to the farmers. He mainly spoke on land security, organic farming and food security. He requested the Indian Council of Agricultural Research to act as a guide to the State Governments of Region-VII in the respective disciplines of agriculture. He further requested the agricultural scientists to make available an agricultural model so as to make the marginal farmer fully independent. He suggested to promote the organic farming mission and publicizing the education of organic farming at the national level by forming a curriculum in this regard. In his opinion – processing of soybean at village level, evolving an alternative to chemical fertilizer and resolving the unemployment at rural level are the priority areas, which should be addressed during the three day meeting.

Dr K.R. Kranthi, Director, CICR Nagpur and Member-Secretary for Region-VII proposed vote of thanks.

The KVK Regional Interface was also held on 3-4th Dec. 2010. The interface started with the welcome address by Dr. K. D. Kokate, DDG (AE). He briefed about various activities performed and salient achievements made by KVKs in the region.

Dr. S. Ayyappan, Secretary DARE & Director General, ICAR said that main motto behind conducting KVK Interface during Regional Committee meeting is for confidence building and cross learning to the Programme Coordinators. He desired to see KVK as Knowledge Management Centre in place of Knowledge Resource Centre.

The Zonal Project Directors of Zone –V, VII, VIII presented the salient achievements of KVKs of their Zone. Vice Chancellors, DDGs, GB Members, ADGs and Directors of ICAR institutes also expressed their views on various aspects of KVKs of the region. Ninety eight Programme Coordinators of various KVKs of this region attended the meeting and expressed their views on various issues related to KVKs.

5. Meeting of the ICAR Standing Committee for TMC MM-1

The Ninth Meeting of ICAR Standing Committee for TMC MM-I was held on 22.01.2011 at Central Institute for Cotton Research, Nagpur under the Chairmanship of Dr. S. Ayyappan, Secretary, DARE and DG, ICAR to review the Annual Progress of TMC MM-I programme. Other prominent members participated in the meeting includes Dr. C. D. Mayee Chairman, ASRB, Dr. Swapan K. Dutta, DDG (CS), Dr. A. K. Singh, DDG (NRM), Shri Suresh Kotak, Chairman, Kotak & Co Ltd., Dr. Sudhir Bhargava, GB Member, ICAR etc.

The Committee critically reviewed the research work done under different projects of TMC MMI and approved the work plan of 2011-12.

6. Brain Storming Session on 'Indian Cotton- What next?'

A brainstorming session on 'Indian Cotton- What next?' was conducted on 22nd January 2011 by the Central Institute for Cotton Research Nagpur. The meeting was chaired by

Honorable Chairman, Agricultural Scientist Recruitment Board, New Delhi, Dr. C.D. Mayee and co- chaired by Dr. Swapan Kumar Dutta, Deputy Director General, Crop Science. Dr. Sudhir Bhargava Member, ICAR General Body and Shri Suresh Kotak, Textile Industrialist were special invitees to the brainstorming session.

The session began with welcome address by Dr. N. Gopalakrishnan Project Coordinator, All India Cotton Improvement project and Head CICR, Regional station, Coimbatore. He highlighted the roles played by the All India Coordinated Cotton Improvement Project and CICR in ensuring the sustainability of cotton cultivation across the country.

Dr. K. R. Kranthi, Director CICR, Nagpur spelt out the position India holds in terms of cotton area, production and productivity. Apart from differences in production practices he said that a turn around could be achieved through the adoption of high density planting systems, cultivation of varieties and the exploitation of the native '*desi*' cotton namely the *G. arboreum*. He put forth evidences to suggest that high density planting with the use of varieties and the use of varieties itself were prime factors responsible for increase in productivity in both Brazil and China. Dr. Kranthi enumerated crop production factors, the biotic and abiotic factors limiting yield in the country and set the ground for the ensuing brain storming session.

Dr. Swapan Dutta Co-Chairman complimented Dr. Kranthi on his presentation that was described as scientific, exhaustive and informative. He informed the house that ICAR seeks to have an active trustworthy public private partnership with prospects of sub-licensing of genes and technologies which would help give a fillip to the public sector research on cotton.

Dr. C. D. Mayee felt that while it was necessary to shift to varieties he exhorted CICR to ensure the maintenance of varieties. He further emphasized to the need to have strong research projects for the development of good diploids. He also felt the imminent need to identify genotypes best suited for the high density planting systems.

Dr. Sudhir Bhargava suggested that cotton researchers take up high density planting with genotypes having an appropriate architecture. Technologies that make cotton cultivation economically viable need to be promoted for adoption by farmers. The public sector organizations working on cotton were asked to ensure a mechanism in place for the production of quality seed

Shri Suresh Kotak advised the development of both, short term and long term programs for achieving an increase in the productivity. He unequivocally supported the necessity of public private partnership and for the exchange of genes with the private sector for the welfare of farmers.

Dr. Monga, Dr. Barik, Dr. Sarode, Dr. Pundir, Dr. Kumar, Dr. Siwach, also put forth their experiences with farmers highlighting the requirements of cotton farmers of their respective region. The program concluded with the vote of thanks proposed by Dr. D.Monga, Head CICR Regional station, Sirsa.

7. Meeting on "Bt cotton – Refugia consideration"

A meeting on "Bt cotton – Refugia consideration" was held on 31/03/2011 under the chairmanship of Dr. Swapan Kumar Dutta, Deputy Director General (Crop Science), IACR, New Delhi. Dr. C D Mayee, Chairman, ASRB, New Delhi was the Co-

Chairman. Dr. P.R. Bharambe, Head Crop Production Division welcomed the delegates. In his introductory remarks, Dr. K.R. Kranthi, Director CICR exhorted that the purpose of the meeting was to discuss sustainable technological options to sustain the benefits of Bt cotton technology for a long time and to recommended implementable (farmers' acceptable) resistance management strategies. In his opening remarks, the Chairman explained that the issue of resistance management and refugia options are not restricted to cotton alone and would be applicable to all the Bt crops. Models followed in other countries growing Bt crops may not hold good under Indian agro ecological and socio economic set up and an implementable Indian model/strategy was needed. The current refugia strategy was not being followed since, it compromises the yield realized by the farmer.

Dr. K.S. Mohan (Monsanto) made a presentation on "Sustaining Bt cotton Technology through adoption of refugia". He explained the three resistance management options-gene pyramiding, refugia strategy and in-planta effective dose. He also urged the need for a science based refugia programme that is implementable under Indian conditions.

Dr. K.R. Kranthi, Director CICR demonstrated the latest version of Bt Adapt model in his presentation. The model could predict the likely time frame for resistance breakdown under various resistance management strategies-two gene (*cry1Ac+cry2Ab*), refugia ratios, fitness costs etc. He also recommended the spray of spinosad to kill survivors as a complementary to refugia management strategy.

Initiating the discussions Dr. C.D. Mayee emphasized that sustaining cotton productivity is more important than sustaining 'Bt' gene and other management strategies including crop diversification, IPM etc. should be comprehensively viewed. He mooted the option of seed mixture (Bt + non-Bt) for North Indian conditions, where the cropping system is not diverse. Representatives from different seed companies and other delegates also expressed their views.

The meeting ended with a vote of thanks proposed by Dr. M.V. Venugopalan, Principal Scientist (Agronomy), CICR, Nagpur.

8. All India Coordinated Cotton Improvement Project

The Annual Group meeting of All India Coordinated Cotton Improvement Project (AICCIP) was organised at MPUAT, Udaipur (Rajasthan) during April, 8-10, 2010. The dignitaries Dr. S S Chahal, Hon'ble Vice Chancellor, MPUAT, Udaipur, Dr K C Jain ADG (Commercial crops), ICAR, Dr K R Kranthi, Director, CICR, Nagpur, Dr S Sreenivasan, Director, CIRCOT, Mumbai, Dr N Gopalakrishnan, PC and Head, Dr Kolhatkar, Jt Director, DOCD, Mumbai and heads of different institutions besides 300 delegates from the state SAUs and private sector and other stake holders attended the meeting. Various Issues pertaining to Cotton R&D were discussed and technical programme for the year 2010-11 was also finalised. Besides, the cotton varietal Identification Committee meeting was held during the Annual Group meeting of AICCIP under the Chairmanship of Dr. K C Jain, ADG (CC), ICAR, New Delhi.

11.5 : Workshops/Farmer's Day Organized

Nagpur

Annual Review Workshop of TMC MM-1

The Annual Review Workshop (2009-10) of Technology Mission on Cotton, Mini Mission-I was held at CICR, Nagpur on

April 26, 2010. Dr. Kranthi welcomed the participants and gave a brief introduction about the recommendations made in the eighth meeting of ICAR Standing Committee for TMC MM 1, held on March 3, 2010, under the chairmanship of Dr. Ayyappan, DG, ICAR at ICAR, New Delhi. He also presented in brief the significant achievements of TMC MM 1 projects during this year. Results of the research work done in each project during the year were critically reviewed and the technical programme for the year 2010-11 was discussed and finalized in the meeting.

Organic Cotton Stakeholders' Workshop

An interactive workshop was convened on August 31 and September 1, 2010 at the Central Institute for Cotton Research, Nagpur in collaboration with Organic Exchange. Mrs. Prabha Nagarajan represented the Organic Exchange, the promoters of organic cotton movement. Representatives from the prominent organic certifying organizations including Ecocert, Control Union, IMO, Onecert and NOCA participated. The leading organic cotton producer groups from India- Bio Re, Chetna, Samrudhi, Pratibha Sintex, Mahima, Zameen Organic, Cotton Connect, Arvind Mills, Agrocel, Sunstar Super Spinning Mills and Ecofarms actively participated in the deliberations.

This workshop addressed several contemporary issues- the availability of non GM varieties/ hybrids in public sector and their suitability to different organic cotton growing areas, participatory seed Production programmes, GM and insecticide residue testing procedures, diagnostic kits and their training needs, organic production technologies and quality input delivery systems and avenues for non-spinnable organic cotton. Several areas for cooperation in R and D between CICR, different certifying agencies and producer groups were also identified. A special interactive session was also held under the Chairmanship of Dr. C. D. Mayee, Chairman, Agricultural Scientist Recruitment Board and former Agricultural Commissioner, Govt. of India. The workshop enabled the participants to learn from each others' expertise and capabilities and initiate an action plan to put in place a strong and sustainable organic cotton production system in India in wake of the challenges facing this segment of industry.

Workshop for IRM Field Workers

A day long workshop on February 8, 2011 was organized under IRM monitoring & review programme for field workers, students and teachers from Ramkrishna Bajaj Krishi Mahavidhyalaya, Pipri-Wardha at CICR Nagpur. The programme was chaired by Dr. KR Kranthi, Director, CICR and coordinated by Dr. S. M. Wasnik, Principal Scientist (Extension), which was attended by around 60 participants.

Workshops on Monitoring of Insect Resistance

1. Data generated by Monsanto Mahyco Biotech (MMB) in the 2009 Cotton season had indicated the development of resistance to *cry1Ac* in populations of the Pink bollworm (PBW) collected from Bt cotton fields of Gujarat. Dr. K.R. Kranthi, Director, CICR, Nagpur put forth his reservations on the research methodology and the data in a GEAC meeting that was called to resolve this issue of Pink Bollworm resistance and CICR was advised to take a lead in this area of work. Hence, as an initiative, Public Private Partnership (PPP) was established with MMB agreeing to join hands with CICR, Nagpur to work together on PBW resistance. CICR would be addressing the problem of pink bollworm resistance to the *cry1Ac* in the year 2010 under TMC MM 3.2 and GEAC project (ICAR 0430) with logistic

support from Monsanto Research Centre, India. In connection with this, a workshop on monitoring of cry1Ac resistance to cry toxins in the pink bollworm was held at CICR, Nagpur on August 17-18, 2010 in which Entomologists drawn from the SAUs collaborating with CICR under TMC MM3.1 and TMC MM3.2 and senior staff of Monsanto Research Centre, India, Mahyco, Jalna and Dow, India participated. A total of 28 persons attended the event. The program was chaired by the Director, CICR Nagpur. Laboratory exercises were demonstrated for mass rearing protocols, including, preparation of diet, release of neonates, maintenance of adult cages, use of special rearing trays, preparation of toxin dilutions, sex differentiation in larval stage etc.

2. A one day workshop on resistance monitoring for insecticides used against sucking insect pests with special emphasis on jassids was held at CICR, Nagpur on August 19, 2010 in the public private partnership mode. It was attended by entomologists from the SAUs collaborating with CICR under TMC MM3.1 and TMC MM3.2. Resistance monitoring data generated at six centers, using a common protocol, namely Sirsa (for North India; Dr. Rishi Kumar), Gujarat (Dr. H. Desai), Nagpur (Central India including Maharashtra and Madhya Pradesh; Dr. S. Kranthi), Guntur (Dr. G.M.V. Prasad Rao), Dharwad (Dr. Udikeri) and Coimbatore (Dr. Dharajothi) was presented. Refinements were made in the technical program for monitoring resistance in sucking pests. Dr. Ranga Rao and his staff from Bayer, India attended the workshop. The program was chaired by the Director, CICR Nagpur.

Farmers meet and strengthening of farmer's linkages

With a view to strengthen linkages with the farmers extension scientist participated in number of farmers meet organized by different organizations and provided scientific information from time to time. Dr. S. M. Wasnik, Principal Scientist (Extension) attended '*Charcha Satra*' on Cotton and Tur on 30th May 2010 at Pusad, Yeotmal district organized by Vasantrao

Naik Smruti Pratisthan, on 'Natural Farming' on 20 October 2010 organized by Marathi daily Newspaper "Agro-One" at Girad, '*Shetkari Charcha Satra*' on 'Organic Farming' on 30 November 2010 at Bamhani, Nagpur tahsil organized by 'Eumenical Sangam', 'Farmers Meet' on 21st December, 2010 at Ballarpur organized by Guru Nanak College of Science, Ballarpur in Chandrapur district, '*Kisan Mela*' on 31 December 2010 at Nagziri in Warud tahsil of Amaravati organized by Krishi Padvidharanchi Krishi Bahauudheshiya Seva Sahkari Sanstha Maryadit, Amaravati., "Farmers Workshop" on 'Water Conservation and Natural Farming' on 17 February 2011 at village Vijay Gopal in Deoli tahsil of Wardha district organized by Govt. of India, Central Water Commission. The programmes were attended by prominent personalities like Sh. Manohar Naik, Min. of Food and Administration, Govt of Maharashtra, by Sh. Harshavardhan Deshmukh, Director, National Horticulture Board, Sh. Subhash Sharma of Natural Farming, Sh. A. M. Patil, Chief Engineer, Water Commission, GOI, Ex-Commissioner & President, Zilla Parishad, Amavati, Zuari Pvt. Ltd, Agril Depts. The entire programmes were well attended by large numbers of farmers, farm women and rural youths. Distributed extension folders to farmers on various topics during the programmes. Farmers were very keen to visit CICR & learn latest technological development in cotton.

Coimbatore

Workshop on Integrated Cotton Production

Two days workshop on "Integrated Cotton Production" had been organized on 7-8th Oct. 2010 at Central Institute for Cotton Research, Regional Station, Coimbatore. Feed back on field problems were collected and discussed. The training was provided to production of hybrid seed, market facilities and price forecast, development programmes, stem weevil and mealy bug control, nematode management, growth hormones use, sucking pests management options, IPM, cotton pest expert system and its use, disease management. The demonstration of poly mulch techniques, multi tier system and low cost drip system were explained to trainees.



11.6. Participation of Scientists in Seminars/ Symposia/ Workshops

| Sr. No. | Seminars/Conferences /Symposia/ Workshops/Training | Place and Date | Participants |
|---------|---|-----------------------------------|--|
| 1. | Annual Group Meeting of AICCIP | MPUAT, Udaipur 8-10 Apr., 2010 | K.R. Kranthi, N. Gopalakrishnan, D.Monga, S.L.Ahuja, O.P. Tuteja, R A Meena, S.K.Verma,Rishi Kumar, S Manickam, T Surulivelu, M Sabesh, S.UshaRani, M.V.Venugopalan, S.M. Wasnik |
| 2. | Monitoring workshop of CeRA | Coimbatore 16 Apr., 2010 | S. Usha Rani |
| 3. | Open Forum discussion on Organic Cotton-on the Recent Problems confronting Organic cotton | Mumbai 17 Apr., 2010 | K.R. Kranthi |
| 4. | National Workshop on Global Plan of Action (GPA) for Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (PGRFA) | New Delhi 17 Apr., 2010 | S Manickam |
| 5. | Workshop on 'Rural Development and Appropriate Technology' | Nagpur 22 Apr., 2010 | S.M. Wasnik |
| 6. | Annual breeder Seed review meeting of breeder seed produced during 2008-09 | New Delhi 24 Apr., 2010 | K Rathinavel |
| 7. | XXX Annual Group Meeting, AICRP- National Seed Project (Crops) | Barrackpore 4-6 May, 2010 | K Rathinavel |
| 8. | Interface Meeting of Directors/ PCs of Crop Science and Horticulture Divisions of ICAR | Jabalpur 17-18 May,2010 | K. R. Kranthi |
| 9. | Review and planning meeting of TMC- MM II | Mumbai 20 May, 2010 | S. Usha Rani |
| 10. | Fifth Meeting of Standing Committee to review applications for commercial release of Bt Cotton hybrids | New Delhi 29 Jun.,2010 | K. R. Kranthi |
| 11. | Protection of Plant varieties and Farmers rights Act Task Force meeting | Mumbai 30 Jun., 2010 | K. R. Kranthi |
| 12. | National conference on current scenario on global challenges in germplasm conservation and biodiversity | Nagpur 7-8 Jul., 2010 | A.B.Dongre |
| 13. | 3rd National Congress on Plant Breeding and Genomics | Coimbatore 7-9 Jul., 2010 | K. R. Kranthi S Manickam KPM Dhamayanthi |
| 14. | 16th meeting of the Technical committee of Central Seed Certification Board | New Delhi 15 Jul., 2010 | K Rathinavel |
| 15. | Director's Conference | New Delhi 15-16 Jul., 2010 | K. R. Kranthi |
| 16. | Interaction Meeting on Mechanization in Agriculture | Bhopal 23-24 Jul., 2010 | K. R. Kranthi |
| 17. | 14th ICAR Industry Meet 2010 | New Delhi 28-29 Jul., 2010 | K. R. Kranthi |
| 18. | Cotton Advisory Board Meeting | Mumbai 30 Jul., 2010 | K. R. Kranthi |
| 19. | Training on identification of mealybug species | New Delhi 2-6 Aug,2010 | Rishi Kumar |
| 20. | Brain Storming Discussion on Strategies for increasing production of oilseeds / vegetable oils | Hyderabad 7-8 Aug., 2010 | S Manickam |

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| 21. | Workshop to review the conduct of DUS test for the period 2007-2010 | Hyderabad 11-12 Aug., 2010 | K Rathinavel |
| 22. | Meeting on Revising the Methodology of estimating Cotton production and also working out advance estimates for 2010-11 | New Delhi 12 Aug., 2010 | K. R. Kranthi |
| 23. | QRT meeting of Directorate of Seed Research, MAU | Hyderabad 12-13 Aug., 2010 | K Rathinavel |
| 24. | Workshop on PBW resistance monitoring | Nagpur 17-18 Aug., 2010 | Rishi Kumar, Chinnababu Naik |
| 25. | Workshop on jassid resistance monitoring | Nagpur 19 Aug., 2010 | Rishi Kumar Chinnababu Naik B Dhara Jothi |
| 26. | Conference on whitefly and thrips transmitted diseases. | New Delhi, 27-28 Aug., 2010 | D .Monga |
| 27. | Workshop on Organic Cotton Stakeholders | Nagpur 31Aug. & 1 Sep., 2010 | S.K.Verma S Manickam M.V.Venugopalan M. Chakrabarty All CICR scientists |
| 28. | AICOSCA Annual General Body Meeting | Mumbai 3 Sep., 2010 | K. R. Kranthi |
| 29. | ICGI Research Conference 2010 | Canberra, Australia 20-23 Sep, 2010 | P.K. Chakrabarty S.K.Verma |
| 30. | Workshop on Paradigm Shift in Cotton Research and Cultivation | Mumbai 18-19 Oct., 2010 | K. Sankaranarayanan |
| 31. | National Conference on Cotton | Surat 19-20 Oct., 2010 | K. R. Kranthi |
| 32. | Three days Indo-UK workshop on Bridging Urban – Rural divide | Wardha 19 – 21 Oct., 2010 | V. Santhy |
| 33. | Conference on Biopesticides Emerging Trend (BET 2010) | Hisar 20-22 Oct, 2010 | Rishi Kumar |
| 34. | National Conference on “ Paradigm Shift in Cotton Research and Cultivation” | Surat 20 -22Oct., 2010 | D Monga., P. K Chakrabarty, S. Usha Rani |
| 35. | 2nd National workshop on Marker assisted selection for crop improvement | Hyderabad 27-29 Oct., 2010 | V.N Waghmare |
| 36. | Sensitization cum training Workshop on ‘Project Information & Management System of ICAR (PIMS-ICAR)’ | Bhopal 11 Nov., 2010 | M.V.Venugopalan |
| 37. | Recent advances in soil science 2010 | Bhopal 14-17 Nov., 2010 | Jagvir Singh Singh, K. Velmourougane, P.R. Bharambe |
| 38. | Meeting on India-Africa Cooperation along the Cotton Value Chain | Mumbai 16-Nov-10 | K. R. Kranthi |
| 39. | Workshop on Towards A Knowledge Economy | New Delhi 18-20 Nov. 2011 | S. Usha Rani |
| 40. | National Conference on Challenges in weed management in Agro-ecosystems Present status and Future strategies | Coimbatore 30 Nov.–1 Dec., 2010 | P. Nalayini Dr. K. Sankaranarayanan |
| 41. | XIX National Symposium on Resource Management Approaches Towards Livelihood security | Bengaluru 2-4 Dec., 2010 | P. Nalayini |
| 42. | 21st Meeting of ICAR Regional Committee No. VII | Bhopal 2-4 Dec., 2010 | K. R. Kranthi |
| 43. | National Workshop on Innovations and Better Management Practices for Climate Resilient and Sustainable Cotton Production | Hyderabad 15-16 Dec., 2010 | B Dhara Jothi M.V.Venugopalan |

| | | | |
|-----|--|---|--|
| 44. | 98th Indian Science Congress | Chennai 3-7 January, 2011 | P Nalayini, M Amutha, S. Usha Rani, A.H. Prakash |
| 45. | Advance training on molecular basis of Host Plant Resistance at Centre of Advance Faculty Training. | 11-31 January 2011, Department of Entomology, CCS HAU, Hisar | Rishi Kumar |
| 46. | National Training "Molecular Characterization of GMO's and its purity testing" | Nagpur 18Jan. - 7 Feb., 2011. | A.K. Mukherjee, C.B.Naik A.Sampath kumar |
| 47. | Brain Storming session on Cotton Breeding | Nagpur 22 Jan., 2011 | All scientists of Breeding & Genetics. D.Monga, S. L Ahuja & S. K. Verma |
| 48. | Annual Review Workshop of TMC- MM II | Mumbai 25 Jan., 2011 | S. Usha Rani |
| 49. | National Seed Congress on Quality Seeds for Prosperity | Pune 29-31 January, 2011. | R. K. Deshmukh , R. A. Meena, A.H. Prakash |
| 50. | International Conference on preparing for climate change | Ludhiana 6-8 Feb., 2011 | T. R. Loknathan |
| 51. | International Conference on Chemistry for mankind : Innovative ideas in Life Sciences ICCM – 2011 | Nagpur 9-11 Feb., 2011 | A.B. Dongre |
| 52. | 10th Agriculture Science Congress Meet | Lucknow 10 Feb., 2011 | K. R. Kranthi |
| 53. | Annual breeder Seed review meeting of breeder seed produced during 2009-10 | New Delhi 14 Feb., 2011 | K Rathinavel |
| 54. | Awareness workshop on Intellectual Property Right | Valparai, (T.N.) 23 Feb., 2011. | Gulsar Banu |
| 55. | Interface meeting of Directors and Vice Chancellor of Agriculture University | New Delhi 23-24 Feb., 2011 | K. R. Kranthi |
| 56. | 5th Meeting of Asian Cotton Research and Development Network | Lahore , Pakistan 23- 25 Feb.,2011 | K. R. Kranthi, D. Monga, P.K.Chakrabarty |
| 57. | Annual Progress Review meeting of the project Implementation of PVP legislation, 2001 | New Delhi 25 Feb.,2011 | K. Rathinavel |
| 58. | National Seminar on Improving Water Productivity: Limits and Opportunities | Gwalior 25-26 Feb., 2011 | M.V. Venugopalan |
| 59. | Meeting of Directors of Crop Science division along with respective chair person of RAC of Institute | New Delhi 1 Mar.,2011 | K. R. Kranthi |
| 60. | Microbial diversity and its applications in health, agriculture and industry | Goa 4-5 Mar., 2011 | Jagvir Singh, K. Velmourougane, P.R. Bharambe |
| 61. | Zonal Technology Management & Business Planning and Development | Mumbai 11-12th March, 2011 | Dr. G. Balasubramani |
| 62. | Meeting of Directors of Crop Science division along with respective chair person of RAC of Institute | New Delhi 17 Mar.,2011 | K. R. Kranthi |
| 63. | Seminar on Soil health improvement for enhancing crop productivity | Coimbatore 17-18 Mar., 2011 | K. Sankaranarayanan |
| 64. | World Congress on Biotechnology-2011 | Hyderabad 21-23 Mar., 2011 | A.B.Dongre |
| 65. | Workshop on "Present status of Cotton Leaf Curl Virus Disease" and its management | Sirsa 30 Mar., 2011, | D.Monga, S.L. Ahuja, O.P. Tuteja, R.A. Meena, S.K.Verma, Rishi Kumar |



11.7. Distinguished Visitors

| Name & Designation | Organisation | Date |
|--|---|------------------|
| Nagpur | | |
| Dr. S. S. Baghel, Ex. Vice Chancellor and Chairman RAC, CICR | Central Agricultural University, Imphal | 19 May, 2010 |
| Dr. C. D. Mayee, Chairman | ASRB, New Delhi | 31 August, 2010 |
| Dr. Gurbachan Singh, Agricultural Commissioner | Ministry of Agriculture, GOI, New Delhi | 12 July, 2010 |
| Shri. P.K. Basu, Secretary, Agriculture | Ministry of Agriculture, GOI, New Delhi | 11 October, 2010 |
| Shri. Mukesh Khullar, Joint Secretary, Agriculture | | 11 October, 2010 |
| Dr. M.M. Pandey, DDG(Agril. Engg.) | ICAR, New Delhi | 18 January, 2011 |
| Dr. S. Ayyappan, Secretary DARE & Director General, ICAR | DARE, Ministry of Agriculture, GOI, New Delhi | 22 January, 2011 |
| Dr. Swapan Kumar Dutta, DDG (CS) | ICAR, New Delhi | 22 January, 2011 |
| Dr. A. K. Singh, DDG (NRM) | ICAR, New Delhi | 22 January, 2011 |
| Dr. C. D. Mayee, Chairman | ASRB, New Delhi | 22 January, 2011 |
| Dr. Sudhir Bhargava, Member ICAR General Body | ICAR, New Delhi | 22 January, 2011 |
| Shri. Suresh Kotak, Chairman | Kotak & Co. Ltd., Mumbai | 22 January, 2011 |
| Dr. V. K. Yadava, Additional Plant Protection Adviser | GOI, Faridabad | 22 January, 2011 |
| Dr. Swapan Kumar Dutta, DDG (CS) | ICAR, New Delhi | 31 March, 2011 |
| Dr. C. D. Mayee, Chairman | ASRB, New Delhi | 31 March, 2011 |
| Coimbatore | | |
| Dr C D Mayee, Chairman | ASRB, New Delhi | 8 July, 2010 |
| Sirsa | | |
| Shri. Ashok Yadav, IAS, Director Agriculture | Govt. of Haryana | 9 October, 2010 |
| Shri. Rajnikanthan, IAS, Deputy Commissioner | | |



11.8: Personnel

| Name of the Officers/Scientists | Designation | Name of the Officers/Scientists | Designation |
|--|-----------------------|---------------------------------------|---------------------|
| K R Kranthi | Director | | |
| PROJECT COORDINATOR (Cotton) | | | |
| Coimbatore | | | |
| N Gopalakrishnan (up to 27.01.2011) | P.C. (Cotton) & Head | | |
| BIOTECHNOLOGY | | | |
| Nagpur | | | |
| G Balasubramani | Senior Scientist | | |
| Smt. J Amudha | Senior Scientist | | |
| K P Raghavendra | Scientist | | |
| Smt Pratiksha Mayee (joined on 17.08.10) | Scientist | | |
| PLANT BREEDING | | | |
| Nagpur | | | |
| P.K. Chakrabarty | HOD, Crop Improvement | | |
| Smt. S B Singh | Principal Scientist | | |
| T R Loknathan | Principal Scientist | | |
| S M Palve | Principal Scientist | | |
| V N Waghmare | Senior Scientist | | |
| M Saravanan (joined on 27.08.2010) | Scientist | | |
| Coimbatore | | | |
| K N Gururajan | Principal Scientist | | |
| S Manickam (joined on 20.11.2010) | Principal Scientist | | |
| Sirsa | | | |
| S L Ahuja | Principal Scientist | | |
| O P Tuteja | Principal Scientist | | |
| S K Verma | Senior Scientist | | |
| GENETICS & CYTOGENETICS | | | |
| Nagpur | | | |
| S B Nandeshwar | Principal Scientist | | |
| Smt. Vinita Gotmare | Senior Scientist | | |
| Coimbatore | | | |
| Smt. K P M Damayanthi | Senior Scientist | | |
| SEED TECHNOLOGY | | | |
| Nagpur | | | |
| R K Deshmukh | Principal Scientist | | |
| Smt. P R Vijayakumari | Principal Scientist | | |
| Smt. V Santhy | Scientist (SS) | | |
| Coimbatore | | | |
| K Rathnival | Principal Scientist | | |
| Sirsa | | | |
| R A Meena | Principal Scientist | | |
| ECONOMIC BOTANY | | | |
| Nagpur | | | |
| Punit Mohan | Principal Scientist | | |
| AGRONOMY | | | |
| Nagpur | | | |
| PR B Harambe | HOD, Crop Production | | |
| MV Venugopalan | Principal Scientist | | |
| R B Singhandhupe (joined on 14.10.2010) | Principal Scientist | | |
| A R Raju | Senior Scientist | | |
| Coimbatore | | | |
| K Shankaranarayanan | Senior Scientist | | |
| Smt P Nalayani | Senior Scientist | | |
| SOIL SCIENCE | | | |
| Nagpur | | | |
| Jagvir Singh | Principal Scientist | | |
| Coimbatore | | | |
| Smt D Kanjana (joined on 03.09.2010) | Scientist | | |
| AGRICULTURAL ENGINEERING | | | |
| G Majumdar | Scientist (SG) | | |
| | | PLANT PATHOLOGY | |
| | | Nagpur | |
| | | M K Meshram | Principal Scientist |
| | | R C Ukey | Principal Scientist |
| | | A K Mukherjee | Senior Scientist |
| | | A Sampath Kumar (joined on 04.05.10) | Scientist |
| | | Coimbatore | |
| | | M Gunasekharan | Senior Scientist |
| | | Sirsa | |
| | | Dilip Monga | Head of Station |
| | | ENTOMOLOGY | |
| | | Nagpur | |
| | | Smt. Sandhya Kranthi | Principal Scientist |
| | | V S Nagrare | Scientist (SS) |
| | | Chinna Babu Naik V | Scientist |
| | | Coimbatore | |
| | | T Surulivelu | Principal Scientist |
| | | Smt. B Dhara Jothi | Senior Scientist |
| | | Smt M Amutha | Scientist |
| | | Sirsa | |
| | | Rishi Kumar | Senior Scientist |
| | | NEMATODOLOGY | |
| | | Nagpur | |
| | | Smt. Nandini Narkhedkar | Principal Scientist |
| | | Coimbatore | |
| | | Smt. J Gulsar Banu | Senior Scientist |
| | | PLANT PHYSIOLOGY | |
| | | Nagpur | |
| | | A H Prakash | Principal Scientist |
| | | Smt Annie Sheeba (joined on 27.04.10) | Scientist |
| | | Coimbatore | |
| | | S E S A Khader | Principal Scientist |
| | | BIOCHEMISTRY (PS) | |
| | | Nagpur | |
| | | A B Dongre | Principal Scientist |
| | | Smt. M Chakrabarty | Scientist (SG) |
| | | MICROBIOLOGY (PS) | |
| | | Nagpur | |
| | | K Velmourougane | Scientist |
| | | AGRICULTURE EXTENSION | |
| | | Nagpur | |
| | | S M Wasnik | Principal Scientist |
| | | Coimbatore | |
| | | Usha Rani | Scientist (SS) |
| | | AGRICULTURAL ECONOMICS | |
| | | Nagpur | |
| | | A R Reddy | Senior Scientist |
| | | Smt Anuradha Narala | Scientist |
| | | Coimbatore | |
| | | Smt. Isabella Agarwal | Senior Scientist |
| | | COMPUTER APPLICATION | |
| | | Coimbatore | |
| | | M Sabesh | Scientist (SS) |
| | | KVK | |
| | | Nagpur | |
| | | S N Rokde | Principal Scientist |
| | | Susanta Saha (joined on 07.10.2010) | Sr. Admn. Officer |
| | | N V R N Murty (joined on 07.03.2011) | F & A Officer |

11.9 : Other Information

Visits Abroad

- Dr. K.R. Kranthi, Director, CICR attended 30th International Cotton Conference held in Bremen, Germany from March 24-27, 2010. He was honoured with a special Bremen Award by President of the Bremen Bauwollborse, Wolfgang vogt-Jordan in Germany. He delivered a special talk on "New Perspectives on Crop Production Research" in the inaugural session of the conference.
- Dr. K.R. Kranthi, Director, CICR was nominated by Govt. of India, Ministry of Commerce and Industry, Department of Commerce Trade Policy Division, New Delhi as a Member of delegation to visit C-4 countries (Chad, Burkina Faso, Benin, Mali), Nigeria, Uganda from 3-14 May, 2010.
- Dr. K.R. Kranthi, Director, CICR Nagpur and Dr. D. Monga, Head, CICR-Regional Station, Sirsa participated in the 5th Asian Cotton Research & Development Network meeting at Lahore, Pakistan from 23-26 February 2011. Dr. K.R. Kranthi presented invited paper on 'Mealybug management' during the meeting.
- Dr. P.R. Bharambe, Head, Division of Crop Production, CICR Nagpur was nominated by Ministry of External Affairs (West Africa Division) and Ministry of Agriculture, Govt. of India, New Delhi as a member of delegation to visit Benin in Western Africa from 22 Nov. - 2 Dec., 2010 for preparation of a feasibility study on enhancing the production of cotton and also the post harvest management and value addition to cotton in Benin.
- Dr. K. Rathinavel, Principal Scientist (Seed Technology), CICR Regional Station, Coimbatore was trained at the International programme on Plant Variety Protection and DUS testing for Indian Experts at the National Institute of Agricultural Botany (NIAB), Cambridge, UK from 28 June - 9 July, 2010.
- Dr. P.K. Chakrabarty, Head, Division of Crop Improvement, CICR Nagpur and Dr. S.K. Verma, Senior Scientist, CICR Regional Station, Sirsa attended the International Cotton Genome Initiative Research Conference held at CSIRO Discovery Centre, Canberra, Australia from Sept. 20-23, 2010. They presented three research papers during the meeting.
- Dr. K.P. Raghavendra, Scientist (Biotechnology), CICR Nagpur attended the Bt resistance mechanisms workshop of the Indo-Australia Bio-technology funded project 'Sustainability of Pyramided Bt genes for Insect Control in Crop Plants'(2008-11), from 19-26 June, 2010 at the Institute of Molecular Biology and Biotechnology at the University of Melbourne, Australia.

Foreign delegation visits to CICR

Heads and members of delegations from eight African countries namely Ethiopia, Kenya, Malawi, Mozambique, Uganda, Tanzania, Zambia and Zimbabwe visited CICR Nagpur in November 2010. The delegation was in India to participate in seminar on "Indian- Africa Cooperation along the Cotton Value Chain" jointly organized by Confederation of Indian Textile Industry and International Trade Centre, Geneva at Mumbai on November 14-19, 2010. During the visit to CICR Nagpur, the delegation members visited important laboratories and experimental fields.

Participation in Agricultural Fair Expo Programme – 2010

Southern Regional Agricultural Fair was organized by Tamil Nadu Agricultural University (TNAU) at Coimbatore District Small Industries Association (CODISSIA) Complex, Coimbatore, Tamil Nadu from Sept.30, 2010 to Oct.03, 2010. This programme was inaugurated by the State Rural and Development Minister Mr. Pongalur Palanisamy. As many as 250 Agricultural Research organizations of various Central/ State Agriculture Departments, Research Stations, Colleges, Farm machinery and farm input producing companies and Non-Government Organizations (NGO) participated and exhibited the new innovations, farm machineries, equipments and improved production / protection technologies in the fair. CICR, Regional Station, Coimbatore also participated in the Southern Regional Agricultural Fair (SRAF) by exhibiting a stall with display boards depicting photographs of recent cotton varieties / hybrids, live specimens of cotton pests, natural enemies, nutritional deficiency symptoms and diseases of cotton. Farmers were explained about various technologies such as multi-tier cropping system, nutritional management and IPM / IRM Strategies in cotton pest management. Different folders/ leaflets pertaining to the improved cotton production technologies and emerging pest management and value addition to Cotton were also distributed. More than 2500 farmers visited CICR Stall. This fair was a useful platform to showcase the technologies developed by CICR, RS, Coimbatore for the benefit of cotton farmers. The programme was coordinated by Dr. (Mrs.) Dhara Jothi, Senior Scientist.

Agro-vision 2011- A National Expo

CICR stall was organized during National Expo- Agro-Vision 2011-Exhibition-"Building sustainable livelihood & increasing farmers income" at Reshim Bagh Ground, Nagpur from March 4-7, 2011. The expo was organized by Vidharbha Economic Development Council and supported by Puri Power and Sugar Ltd. The exhibition was designed with the thrust areas to 'Educate, Encourage & Empower farmers and CICR, Nagpur participated in the expo and highlighted activities of institute through displaying exhibit banners such as cotton varieties/hybrids developed by CICR developed, cotton production technologies, pests management, diseases management, biotechnological tools, machineries and implements, IRM strategies, physiological disorders, organic cotton production of mileaykit/mealykil, etc. Live materials such as Bt detection kits, cotton planter, solar power sprayer, adjustable hoe, etc. were kept which was an attraction for the visiting farmers.

Library

Additions

During 2010-11, the Library purchased 163 new books and subscribed 18 foreign journals and 30 Indian journals.

Documentation Services

- Library has developed computerized bibliographic database on cotton to provide comprehensive and updated information on cotton. About 3900 bibliographic references along with abstracts have been stored in it. Based on this bibliographic database the Library publishes a current awareness bulletin namely "COTTON RESEARCH ABSTRACTS". The Bulletin is circulated to all the scientists of the Institute and to all AICCIP Centers in India. In the reported period, four issues of COTTON RESEARCH

ABSTRACTS (V24, (No. 1-4), January – December 2010) were published and circulated.

- The Library is actively participating in the CeRA, a E-Journal Consortium by responding regularly through E-mails and thus also receiving updates. More than 2000 on-line journals on agriculture and crop science are made available over the network through this consortium.
- Four User Terminals installed in the Library have facilitated the library users to access the databases uploaded in the Library Server. Users can also access the Internet on these terminals. Similarly the entire catalog of the library has been downloaded on these terminals for ease of use.
- The WebOPAC version of the Library software SLIM21 was updated and by using this Library Application Software, the entire catalogue of holdings of the Library (books and bound volumes) is available on all terminals within the Institute.

Progressive Use of Hindi

Nagpur

Hindi Day :

- CICR celebrated Hindi Day as Hindi *Chetna* fortnight during 13-28 Sep, 2010 at the Institute Headquarters, Nagpur. Various programmes and competitions like handwriting, dictation, word-meanings, *lokoti* question-answer, news-reading, word-translations, debate, song translation, hindi-poetry writing, *hasya kavi-sammelan*, publication of technical/scientific articles in Hindi, administrative work in Hindi, etc. were organized during this fortnight. The winners were awarded prizes during the valedictory function held on 28th Oct, 2010.
- In administrative work in Hindi competition Shri. Richhpal Singh (Sirsa Centre) got 1st prize, Shri. Prakash Mishra (Nagpur) got 2nd prize and Shri. Satbir Singh (Sirsa Centre) got 3rd prize. In publishing technical/scientific articles Dr. Rishikumar from Sirsa Centre got 1st prize while Dr. S. N. Rokde (Nagpur) was awarded 2nd prize. The chief guest Dr. M. S. Kairon, Ex-Director of CICR and Dr. K. R. Kranthi, Director addressed on the occasion.
- Hindi Day was also celebrated in Institute's regional stations Sirsa and Coimbatore, wherein, various programmes were organized and the winners were awarded.
- Translation work in different disciplines was done as and when required. The executive summary of research

achievements during 2009-10 was translated in Hindi and published in the Institute's Annual Report for the year 2009-10.

- Popular articles and extension folders were prepared in Hindi and published for farmers and extension personnel.

Coimbatore

Official Language Implementation Activities

The Official Language Implementation is being effectively carried out at CICR, Regional Station, Coimbatore. In the month of September 2010, Hindi day was organized. Various competitions like memory contest, reading and writing in Hindi, translation, objective words usage, general knowledge and comprehension based questions were held for scientists and staff during Hindi Day celebrations and prizes were distributed on October 4, 2010.

The CICR, Coimbatore was awarded a special prize for commendable performance in Hindi Implementation for the year 2009-10 by the Town Official Language Implementation Committee, (TOLIC) Coimbatore. The Half Yearly Meetings organized by the TOLIC were regularly attended by PC and Head and Hindi Liaison Officer of this Station Ms. Subhasree.

The Official Language Implementation Committee Meeting is being regularly organized at CICR, Coimbatore to discuss various issues on Development and Proceedings sent to Head quarters. The Hindi Workshops are regularly organized as per the Official Language Policies to promote Hindi usage in official activities by the staff members and to learn official use and communicative Hindi. The Name Boards indicating the Scientists and Staff members and Name Boards of all scientists and Labs have been made both in Hindi and English. Annual Purchase for Hindi Books worth Rs.2200/- has been done. Regular Correspondence to Head quarters regarding Hindi activities, Quarterly Hindi Meeting, Scientific Articles for Institute Magazines has been carried out. The Hindi Cell and the Official Language Implementation Committee of this Institute are working towards achieving the Progressive use of Hindi at this Institute.

Sports

CICR, Nagpur participated in ICAR Zonal Tournament (Central Zone) meet at Directorate of Weed Science Research, Jabalpur during February 15-19, 2011 and won Gold medal in Javelin Throw by Smt. Sunita Chauhan, Silver medal in Chess & Carrom by Dr. Vijaya Kumari, & Smt. Shubhangi Kharche and Smt. Sunita Chauhan won Bronze medal in 100m race & Discuss throw respectively.



11.10: Weather

Nagpur

| Month | Temperature (°C) | | Relative Humidity (%) | | Rainfall (mm) | No.of Rainy Days |
|-----------------|------------------|------|-----------------------|------|---------------|------------------|
| | Max. | Min. | Max. | Min. | | |
| June, 2010 | 40.1 | 28.2 | 60.2 | 37.9 | 157 | 6 |
| July, 2010 | 31.0 | 24.4 | 90.7 | 73.3 | 385 | 19 |
| August, 2010 | 30.6 | 24.0 | 88.4 | 74.4 | 266 | 18 |
| September, 2010 | 31.8 | 23.9 | 88.0 | 65.4 | 214 | 9 |
| October, 2010 | 32.1 | 21.8 | 77.2 | 55.2 | 10 | 1 |
| November, 2010 | 30.5 | 19.9 | 83.8 | 56.2 | 17 | 3 |
| December, 2010 | 29.3 | 13.2 | 72.2 | 36.6 | 0 | 0 |
| January, 2011 | 28.5 | 11.4 | 61.8 | 29.3 | 0 | 0 |
| February, 2011 | 30.8 | 15.2 | 64.2 | 31.7 | 0 | 0 |
| Total | | | | | 1049 | 56 |

Coimbatore

| Month | Temperature (°C) | | Relative Humidity (%) | | Rainfall (mm) | No.of Rainy Days (>2.5mm) |
|-----------------|------------------|------|-----------------------|------|---------------|---------------------------|
| | Max. | Min. | Max. | Min. | | |
| April, 2010 | 36.6 | 25.2 | 85 | 42 | 15.0 | 2 |
| May, 2010 | 34.5 | 25.0 | 89 | 51 | 99.9 | 4 |
| June, 2010 | 32.2 | 24.0 | 84 | 57 | 40.8 | 4 |
| July, 2010 | 31.7 | 23.4 | 82 | 57 | 8.3 | 1 |
| August, 2010 | 30.5 | 22.7 | 88 | 63 | 69.9 | 3 |
| September, 2010 | 31.4 | 22.7 | 88 | 56 | 25.6 | 2 |
| October, 2010 | 31.1 | 22.2 | 91 | 62 | 156.4 | 9 |
| November, 2010 | 28.1 | 21.8 | 95 | 70 | 311.1 | 15 |
| December, 2010 | 28.3 | 19.3 | 93 | 61 | 35.0 | 2 |
| January, 2011 | 30.1 | 19.0 | 89 | 44 | 0.4 | 0 |
| February, 2011 | 31.6 | 18.4 | 89 | 40 | 125.6 | 3 |
| March, 2011 | 33.5 | 20.7 | 88 | 35 | 23.6 | 1 |
| Total | | | | | 911.6 | 46 |

Sirsa

| Month | Temperature (°C) | | Relative Humidity (%) | | Rainfall (mm) | Rainy Days |
|-----------------|------------------|------|-----------------------|------|---------------|------------|
| | Max. | Min. | Max. | Min. | | |
| April, 2010 | 40.5 | 23.4 | 50.0 | 24.8 | 0.2 | 2 |
| May, 2010 | 42.6 | 27.3 | 42.5 | 18.8 | 16.0 | 2 |
| June, 2010 | 40.5 | 27.8 | 51.3 | 31.3 | 43.6 | 3 |
| July, 2010 | 35.3 | 27.5 | 82.6 | 60.4 | 161.6 | 15 |
| August, 2010 | 35.0 | 27.3 | 85.5 | 61.8 | 149.0 | 8 |
| September, 2010 | 32.8 | 24.2 | 86.5 | 63.0 | 157.7 | 9 |
| October, 2010 | 32.7 | 19.2 | 80.8 | 37.4 | 0.0 | 0 |
| November, 2010 | 27.7 | 12.0 | 76.8 | 30.3 | 0.0 | 0 |
| December, 2010 | 31.3 | 5.9 | 82.8 | 43.0 | 4.4 | 1 |
| Total | | | | | 531.5 | 40 |

11.11 : Cotton Scenario

Cotton is one of the principal crops of India and plays a vital role in the country's economic growth by providing substantial employment and making significant contributions to export earnings. World cotton production is expected to be around 25.19 million tones of which India's contribution would be about 22 per cent (5.53 million tones).

Cotton Cultivation in India

India is the only country to grow all four species of cultivated

cotton besides different combinations of hybrids. The majority of the cotton in India is grown in nine states which are grouped into three different zones namely, Northern zone (Punjab, Haryana and Rajasthan), Central zone (Maharashtra, Madhya Pradesh and Gujarat) and Southern zone (Andhra Pradesh, Karnataka and Tamil Nadu). Approximately 65% of India's cotton is produced under rainfed condition and 35% on irrigated conditions. Details of cotton scenario (2010-11) are given in Table 1 and 2.

Table 1: Cotton Growing Zones in India

| Zones | North Zone | Central Zone | South Zone |
|---------------------------------|---|---|---|
| States | Punjab, Haryana, Rajasthan | Maharashtra, Madhya Pradesh, Gujarat | Andhra Pradesh, Karnataka, Tamil Nadu |
| Area (Lakh ha) | 13.59 | 72.57 | 24.40 |
| Production (Lakh bales) | 39.00 | 201.00 | 68.00 |
| Productivity (kg/ha) | 488 | 471 | 474 |
| Conditions | 100% irrigated | Irrigated and rainfed | Irrigated and rainfed |
| Soil Type | Alluvial soils | Black cotton soils | Black soils and Red soils |
| Nature of Genotype | Hybrids and varieties | Hybrids and varieties | Hybrids and varieties |
| Species Hybrids | <i>G.hirsutum</i> , <i>G. arboreum</i> intra <i>hirsutum</i> | <i>G. hirsutum</i> , <i>G. arboreum</i> , <i>G.herbaceum</i> , intra- <i>hirsutum</i> | <i>G.hirsutum</i> , <i>G. arboreum</i> , <i>G. herbaceum</i> , <i>G. barbadense</i> , Interspecific tetraploids(HB) |
| Insect/ Pest | Whitefly, Mealy bug | <i>Helicoverpa</i> , Whitefly, Jassids, Aphids, Pink bollworm, Mealy bug | <i>Heliothis</i> , Whitefly, Jassids, Aphids, Pink bollworm, Mealy bug |
| Diseases/physiological disorder | Leaf curl virus, Wilt | Wilt, leaf reddening | Wilt, Foliar disease |
| Sowing Method | Drill Sown | Hand dibbling | Hand dibbling |
| Time of Sowing | April-May | June-July | Aug-Sept |

Cotton Situation after introduction of Bt hybrids

After the introduction of Bt-cotton in 2002, India's contribution to global cotton production increased from 14% in 2002 to 20.5% in 2007. The production increased from 170 lakh bales in 2002 to all time highest record of 315 lakh bales during 2007-08 and 312 lakh bales in 2010. For five consecutive years after 2005, India has harvested a record average of 300 lakh bales, leaving behind the best ever historical record of 165 lakh bales before the introduction of Bt cotton. India has been producing at least 60-90 lakh bales in excess of domestic consumption over the past few years. Domestic consumption also increased from 168 lakh bales in 2002, to 247 lakh bales in 2010. It is widely believed that the introduction of Bt cotton into India has contributed to the sudden increase of India's contribution to global cotton production. The enhancement in yields has been primarily due to several technological changes that have taken place since 2002, significantly related to the introduction of Bt-cotton, new cotton hybrids, seed treatment and process, new novel pesticides, feasible research outcome from NATP, NAIP, TMC, IRM, IPM and INM. Apart from these, the 29% increase in area under cotton from 78 lakh hectares in 2002 to 111 lakh ha in 2010, increase in hybrid cotton area from 40% in 2001 to 92% in 2010, favourable weather conditions, extremely low bollworm infestation and good market price for the cotton have contributed to the rise in area and production. India became a leading global exporter of raw cotton with exports ranging from

35 to 85 lakh bales raw cotton each year from 2005 onwards, while concomitantly, imports declined from 25 lakh bales to 5 lakh bales. The quality has improved, trash content was reduced and bollworm affected 'bad-kapas' was gone. Prior to 2002 long staple cotton production was only 38% of the total cotton, but after five years the proportion increased to 77%. Insecticide use on cotton was 46% of the total insecticides used in India in 2001 and before, but soon declined to 25% within 4 years of Bt cotton introduction.

Despite the good progress made by public and private sector research and development, it is a matter of concern that productivity started to decline from 566 kg/ha in 2007 to 522 kg/ha in 2008, 486 kg/ha in 2009 and 475 kg/ha in 2010. The factors responsible for the decline included erratic rainfall and emerging biotic and abiotic stress. The quality profile of Indian cotton has also changed. Long staple cotton which constituted 20% in 2000, increased to 74% of the total cotton produced in 2010 because of the Bt cotton hybrids, most of which are of the long staple category. The area under public research bred varieties and hybrids reduced significantly to less than 8% of the total cultivable area and is anticipated to shrink further. The area under hybrid cotton increased from 40% in 2002 to 92% in 2010. The area under *G. hirsutum* varieties was 33% in 2000 which reduced to less than 3% in 2009. The area under *G. barbadense*, *G. arboreum* and *G. herbaceum* was 6.6%, 25% and 13% during 1995, which has

declined to less than 7% in 2010 for the three species together. Without proper refugia compliance with more than 90% area under Bt-cotton, there was high risk of bollworm resistance development (8 to 32-fold in *H. armigera*). CICR was exploring the possibilities to develop adaptable resistance management strategies. Another immediate concern was jassid resistance to Gaucho to an extent of 50 to 5450-fold resistance in 75% populations tested. Since all hybrid seeds are treated and crop is also sprayed with Imidacloprid, insecticide usage and concomitant pest resistance to imidacloprid had increased.

Emerging biotic stress factors such as mealybugs, miridbugs and minor pests have started causing considerable economic damage. New abiotic stress factors such as leaf reddening and wilt emerged as major problems. At this crucial juncture, there is an imminent need to plan with a renewed vision to address all the concerns through good research and extension initiatives so as to enable India become the global leader in cotton.

Details of state-wise cotton area, production and productivity are given in Table 2.

Table 2: State-Wise Cotton Area, Production and Productivity

| Zone/State | 2009-2010 | | | 2010-2011 | | |
|---|----------------|-------------------------|----------------------|----------------|-------------------------|----------------------|
| | Area (Lakh ha) | Production (Lakh bales) | Productivity (Kg/ha) | Area (Lakh ha) | Production (Lakh bales) | Productivity (Kg/ha) |
| Punjab | 5.11 | 14.25 | 474 | 5.30 | 16.00 | 513 |
| Haryana | 5.07 | 14.75 | 495 | 4.95 | 14.00 | 481 |
| Rajasthan | 4.44 | 11.00 | 421 | 3.34 | 9.00 | 458 |
| North Zone | 14.62 | 40.00 | 465 | 13.59 | 39.00 | 488 |
| Gujarat | 26.25 | 98.00 | 635 | 26.33 | 102.00 | 659 |
| Maharashtra | 35.03 | 63.00 | 306 | 39.73 | 82.00 | 351 |
| Madhya Pradesh | 6.11 | 15.00 | 417 | 6.51 | 17.00 | 444 |
| Central Zone | 67.39 | 176.00 | 444 | 72.57 | 201.00 | 471 |
| Andhra Pradesh | 14.75 | 52.00 | 599 | 17.76 | 53.00 | 507 |
| Karnataka | 4.55 | 9.00 | 336 | 5.34 | 10.00 | 318 |
| Tamil Nadu | 1.04 | 5.00 | 817 | 1.30 | 5.00 | 654 |
| South Zone | 20.34 | 66.00 | 552 | 24.40 | 68.00 | 474 |
| Others | 0.32 | 1.00 | 227 | 1.05 | 4.00 | 648 |
| Total | 103.10 | 283.00 | 486 | 111.61 | 312.00 | 475 |
| Loose cotton consumed but not counted for in State-wise prod. | | 12.00 | | | 0.00 | |
| Grand Total | 103.10 | 295.00 | 486 | 111.61 | 312.00 | 475 |

1 bale= 170 kg.

Source : Office of the Textile Commissioner, Mumbai.

11.12 : Impressions of Visitors

The visit to the Institute and interactions with the colleagues were very interesting, bringing out the new lines and leads that the CICR has made. Cotton in India has received much from this Institution. The future is exciting as well as demanding for the researchers here. Compliments to the Director and Colleagues at CICR and Best wishes in all future endeavours .

Dr. S. Ayyappan,
Secretary, DARE & DG, ICAR,
New Delhi

Visit CICR in the New Year and was happy to see the progress both physical and technical made by the Institute in the last few years. I Congratulate the Director and staff for this. New Year can be devoted to take up another resolve to see cotton productivity to touch 1000 kg lint/ha. This will bring prosperity to cotton farmers of India.

Dr. C. D. Mayee,
Chairman, ASRB,
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