

5. TRAINING AND CAPACITY BUILDING

5.1: Education

- i. Kunal Pradip Gawande carried out research work on "Distribution and characterization of endosymbionts in geographical populations of pink bollworm (*Pectinophora gossypiella*)" under the guidance of Dr. Sandhya Kranthi, Principal Scientist & Head of Crop Protection Division, CICR, Nagpur for his M.Sc.(Ag) Biotechnology thesis for submission to Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad.
- ii. Sandip Agale carried out research work on "Efficacy of Cry toxins on agro-ecological populations of *Spodoptera litura* (Fabricius)" under the guidance of Dr. Sandhya Kranthi, Principal Scientist & Head of Crop Protection Division, CICR, Nagpur for his M.Sc. thesis that was submitted to Indira Gandhi Krishi Vishwa Vidyalyaya, Raipur during 2015.

The aim was to compare the relative efficacy of Cry1Ac, Cry2Ab and Cry1Ac + Cry2Ab and non Bt on *Spodoptera litura* from different zones using *in planta* and standard toxin bioassays.

It was concluded that :

- a) Intraspecific variability in susceptibility of *S. litura* populations to Cry toxins existed.
- b) Cry1Ac +Cry2Ab is superior to Cry1 Ac alone

in *in planta* bioassays against this pest especially at mid reproductive stage.

- c) Bollgard and Bollgard II are equally vulnerable to early season *S. litura* incidence and damage.

Fellowship programme

Dr. Ahmed Mohamed Abd El-Moghny Abd El-Baky, Researcher (Cotton Breeder), from Central Research Institute (CRI), Agricultural Research Centre (ARC), Giza, Egypt underwent a training fellowship programme for developing country during the period 2nd June to 25th November 2015. The research work was on 'Genetic, physiological and molecular basis of drought tolerance in cotton' and successfully completed the fellowship at this Institute. The training programme was coordinated by Dr. S.B. Singh, I/c Head & Principal Scientist and Dr. H. B. Santosh, Scientist, Division of Crop Improvement, ICAR-CICR, Nagpur.



5.2: Training

5.2.1: Training Received

Name of the Officials	Name of the course/training	Place	Period
Dr. S. Manickam	Monitoring Confined Field Trials for Regulatory Compliance	DBT, New Delhi,	25.05.2015 to 26.05.2015
Dr. G. Balasubramani Dr. V. Nagrare	Biosafety Compliance Readiness Training of ICAR Scientists	BCIL, New Delhi	27.05.2015 to 28.05.2015
Dr. Santosh H. B.	Monitoring Confined Field Trials for Regulatory Compliance	ICAR-NAARM, Hyderabad	03.06.2015 to 04.06.2015
Dr. M. Saravanan	Mendelian Genetics to Molecular Genetics in relevance to Plant Breeding	PAU, Ludhiana	06.08.2015 to 26.08.2015
Dr. A. Manivannan Dr. Santosh H. B.	Quality Evaluation of Cotton	ICAR- CIRCOT Mumbai	25.08.2015 to 27.08.2015
Dr. Raghavendra K.P.	Developing Winning Research Proposals in Agricultural Research	ICAR-NAARM, Hyderabad	25.08.2015 to 29.08.2015

Name of the Officials	Name of the course/training	Place	Period
Dr. A.Manivannan	Risk Communication under UNEP-GEF supported phase-II capacity building project on biosafety	ICRISAT, Hyderabad	29.10.2015 to 31.10.2015
Mr. Joy Das Mr. Rakesh Kumar	TILLING in Crop Plants	University of Hyderabad, Hyderabad	07.12.2015 to 17.12.2015
Dr.S.B. Nandeshwar	Competency Development for HRD Nodal Officers of ICAR	NAARM, Hyderabad,	10.02.2016 to 12.02.2016

5.2.2: Training Imparted

International training

In-country training on 'Modern Cotton Production Technologies'

Under the Cotton TAP, two-day in-country training was conducted from 29 February to 1 March 2016. Dr. D. Monga and Dr. D. Blaise from ICAR-CICR delivered lectures on various aspects of 'Modern Cotton Production Technologies'. The training was organized in the Institute for Agricultural Research, Ahmadu Bello University, Zaria. Dr. AbuBaker, Executive Director of IAR, Samaru was the Chief Guest. Mr. Yerima, Nodal Officer of Cotton TAP in Nigeria co-ordinated the training.



Group photo of the participants attending the in-country training at Zaria, Nigeria

National Training

Nagpur

Farmers' Training on the cultivation of *desi* cotton "Phule Dhanwantary"

ICAR-CICR, Nagpur in coordination with the YUVA Rural Association, Nagpur organized a one day training on the cultivation of *desi* cotton variety "Phule Dhanwantary" under High Density Planting

system on 27th May 2015. Around 40 farmers from Nagpur, Wardha, Amravati, Buldhana, Washim, Akola and Jalna districts of Maharashtra were the beneficiaries. Shri Datta Patil, Founder, YUVA Rural Association welcomed the farmers and officials and stated that the objective of the training was to understand the package of practices for the cultivation of *Desi* cotton and re-inforce the do's and dont's in its cultivation. Dr. K. R. Kranthi, Director, ICAR-CICR narrated the recent R&D efforts on *desi* cotton and the appreciated the new initiative leading to the formation of Vidarbha *Desi* Cotton Growers' Association under the stewardship of Yuva Rural Association. Dr. Vinita Gotmare, Principal Scientist, CICR made a detailed presentation through slide show explaining the complete production and protection technology for profitable cultivation of Phule Dhanwantary. Dr. Sandhya Kranthi HOD, Crop Protection, Dr. D. Blaize, HOD, Crop Production, Dr. Suman Bala Singh, HOD, Crop Improvement and Dr. M. V. Venugopalan responded to various questions raised by the farmers regarding weed control, pest management, seed production, economics and marketing. Later Dr. Laximikant Padole, Director, Neem Foundation, Nagpur made a presentation on





the preparation of Neem Seed Kernal extract and its use for pest management in cotton and other crops. Representatives from surgical cotton industry also attended the training workshop. Seeds to participating farmers were also supplied at a nominal cost. Apart from this, Better Cotton Initiative also took up this *desi* cotton on 50 farmers' fields in the various districts of Vidarbha. Surveys were conducted by Dr. D. Blaise, Dr. S.N. Rokde, Dr. Anuradha Narala and Sh. Chaturvedi. It was observed that, in general despite being a drought year, the farmers who cultivated Phule Dhanwantary following the recommended package of practices and obtained yields in excess of 6 q/acre and as high as 10 q/acre. However, low yields (2 q/acre) were reported from few farmers who cultivated the cotton on very shallow and stony soils without adequate plant stand and due to late planting. All the participating farmers were provided with 5 kilograms of seeds of Phule Dhanwantary, sufficient for planting in one acre, along with a leaflet containing the package of practices.

Awareness training on cotton - soybean intercropping

ICAR-CICR, Nagpur is implementing FLDs on cotton - soybean intercropping in Nagpur and Wardha districts at farmers field. To create awareness about intercropping a one-day awareness training was organised at village Jogingumpha near Girad in Samudrapur tahsil of Wardha district on 19.6.2015. Dr S.M. Wasnik, Principal Scientist (Agricultural Extension), CICR, Nagpur highlighted the importance of intercropping and advised the farmers to take short duration intercrops of green gram, black gram in between two rows of cotton. On the occasion, 35 packets of



Bradyrhizobium japonicum were supplied to farmers for soybean seed treatment for intercropping trials.

One-day Training Camp Under ATMA

A team of CICR scientists comprising of Director, Dr. K. R. Kranthi, Dr. Sandhya, Dr. M.V. Venugopalan, Dr. Vinita Gotmare and Dr.V. Santhy conducted a one-day training camp for more than 100 farmers in the Krushi Jagruthi Saptah on 6th July 2015 at Jamb, Wardha district organized by ATMA. Dr. Vinita in her detailed presentation described the strategies of the HDPS program in Marathi, while Dr. Kranthi gave a brief history on the inception of HDPS. Dr. S. Kranthi, Dr. Venugopalan and Dr. Santhy spoke on protection, production and seed production aspects of HDPS, respectively. The programme was coordinated by Shri Rajesh Chandewar, BTM Samudrapur.

Training cum field demonstration on HDPS technology

A training cum field demonstration on HDPS was organized at ICAR-CICR Nagpur for 25 participants from BCI (Better Cotton Initiative) and few other stakeholders. The programme was co-ordinated by Dr. Blaise Desouza, Head, Crop Production. Dr. K. R. Kranthi, Director, ICAR-CICR, gave an overview of HDPS and its relevance in the present day context. He highlighted the ills of spraying pesticides unnecessarily that are creating resurgence of sucking pests such as whiteflies. He insisted that the indigenous varieties are more robust and able to withstand most of the biotic and abiotic stresses. Further, these involve a much lower cost of cultivation. A field visit was organized to demonstrate the HDPS. The importance of



appropriate spacing and selection of compact, early genotypes was explained by Ms. Shubangi Lakde. Dr. Blaise explained about the various inter-crops grown from the view point of saving fertilizer N, obtaining additional returns and more importantly meeting the pulse requirement of the country. Some legumes and oilseeds such as groundnut and soybean were also being tried. The participants shared their experience about the ongoing trials on HDPS implemented by BCI in Maharashtra. Several questions raised by the participants were also addressed by Dr. Sandhya Kranthi, Head, Crop Protection and Dr. M.V. Venugopalan, Principal Scientist. Dr. S. N. Rokde, Dr. Anuradha Narala and Dr. A. Manikandan were also present.

Training Camp Sponsored by DCD, Min. of Agri., GOI

The training programme sponsored by the Directorate of Cotton Development (DCD), Ministry of Agriculture, GOI was organized at CICR, Nagpur on 28 September 2015 for the farmers of Wardha and Nagpur district of Vidharbha adopted under 'Mera Gaon Mera Gaurav' programme. Dr. K. R. Kranthi, Director, CICR stressed the need of building strong relationships and trust between farmers and scientists. He said that this programme can help scientists to strengthen their

understanding of farmer problems so that research work can be oriented accordingly. He asked scientists and farmers to be in constant touch so that a model example of 'Lab to Land' can be developed. He said that the 'e-Kapas' programme which sends weekly 'voice mail' advisories to 1.25 lakh farmers, should be utilized fully by the farmers. Dr S. M. Wasnik, Principal Scientist, Extension and Nodal Officer of MGMG programme highlighted the importance of the 'Mera Gaon Mera Gaurav' programme. Dr R.P. Singh, Director DCD, GOI outlined the schemes of his department for cotton farmers. Dr. D. Blaise, Head Crop Production and Dr Suman Bala Singh, Head, Crop Improvement, spoke on production technologies and choice of appropriate varieties in cotton. Scientists took farmers to the experimental fields and explained research work being undertaken. Participants were taken to experiments of HDPS, intercropping, pest and disease management, goat farming, etc. Literature in local Marathi language on improved cotton cultivation and other aspects were distributed. Films on package of practices on cotton, HDPS, nutrient management, pests and diseases, physiological disorders were shown. Question- answer session organised to clear the doubts of farmers. Around 230 farmers from villages adopted by ICAR-CICR scientists under MGMG programme attended training.



Farmers Training program under NFSM-IRM-HDPS

A one-day farmers training camp was organized by Dr. S. Kranthi and Dr. J. Meshram at ICAR-CICR, Nagpur on 31 October, 2015 for the farmers of Wardha District on Insecticide Resistance



Management (IRM) in High Density Planting System (HDPS) under National Food Security Mission (NFSM). Around 70 NFSM-IRM-HDPS farmers attended. In Wardha district, in collaboration with Ramkrishna Bajaj College of Agriculture, Pipri, IRM/ HDPS programme is taken up in 35 villages in 174 acres on 154 farmers fields



with variety Suraj. Dr. Sandhya Kranthi, Head, Crop Protection Division, ICAR-CICR Nagpur delivered a lecture on the importance of HDPS and Insect-Pest management in cotton while Dr J. H. Meshram delivered talk on abiotic stress in cotton. The farmers were also shown the experiments and demonstration plots of HDPS. During farmer - scientist interaction, farmers reported that some fields had off type plants and bollworm attack was severe in some fields. Farmers were asked to take corrective measures using the right chemicals.

Field Experience Training (FET) Programme for ARS trainees

A 21 days FET programme for ARS Scientist trainees from NAARM, Hyderabad was conducted from 8.02.2016 to 28.02.2016 at ICAR-CICR, Nagpur. The FET studies were undertaken at Mangali village located at 25 km from Nagpur which is one of the adopted village of CICR under Mera Gaon Mera Gaurav. On the concluding day, the trainee scientists presented the general socio-economic and agro-ecological scenario of the village, constraints identified using PRA tools and suggestions offered to redress them. They also interacted with the Director and scientists of the institute. Dr. R.B. Singandhube, Head I/c, KVK, CICR, Nagpur and Dr. V. Santhy, Senior Scientist, Crop Improvement were the local co-ordinators.



Coimbatore

Training Programmes for Tribal Cotton Growers under Tribal Sub Plan

The first training program on “Integrated Crop Management Practices in Cotton” for Tribal Cotton growers was conducted on 19 & 20 November 2015. Sixteen tribal cotton growers from Jolarpet, Vellore district of Tamil Nadu participated. Dr. N. Gopalakrishnan, Project Coordinator (Cotton) and

Head I/c, CICR, RS, Coimbatore, in his inaugural address, elaborated the scenario of cotton in the world and India and especially in Tamil Nadu. Then, the trainees were exposed to various cotton improvement, production and protection technologies by the scientists.

The second training program on “Integrated Crop Management Practices in Cotton” was conducted on 18.01.2016 & 19.01.2016. Twelve tribal cotton growers from Kalvarayan hills, Salem District of Tamil Nadu have participated. The programme was inaugurated by Dr. S.E.S.A. Khadar, Principal Scientist and Project Coordinator and Head I/c on 18.1.2016. In his inaugural address, he elaborated the scenario of cotton and explained about pruning techniques in cotton and CICR- Nutrients consortia in detail. The trainees were also exposed to various cotton improvement, production and protection technologies by the scientists. Training kits and participation certificates was distributed.

Sirsa

Farmers Training program under NFSM-IRM-HDPS

In Sirsa district, the IRM program was taken up in four villages in 1600 acres area and the HDPS demonstration programme was conducted on 200 acres. Under HDPS programme, *Desi* cotton varieties (CICR-1 & CICR-3) were demonstrated under HDPS with 30,000 plants/ acre as against normal planting of 20,000/per acre. One day farmer training camp was also organized on 1st August in which 80 NFSM-IRM-HDPS farmers from different villages of Sirsa district attended. Dr D. Monga, Head of the station delivered a lecture on the importance of HDPS and diseases management in cotton, Dr R. A. Meena delivered a lecture on seed production in cotton and genotypic suitability under HDPS and Dr Rishi Kumar delivered a lecture on



pest management in cotton. Dr S. L. Ahuja, also interacted with the farmers. The farmers were also shown the demonstration plot of HDPS.

Training Workshop on Cotton Production

A training workshop on cotton production and protection technologies was organized on 23 October, 2015 in collaboration with United Farmers Empowerment Initiative (UFEI). Around 80 progressive farmers representing regional farmer associations of Haryana, Punjab and Rajasthan participated. At the outset Dr Monga, Head of the Regional Station highlighted the major issues concerning cotton farmers in the north zone. He focussed on the damage caused by whitefly during the season, cotton leaf curl virus disease and stressed on the strategies developed by the station and their dissemination. He also informed the farmers about the thrust areas of the station like high density planting system and promotion of *desi* cotton varieties and hybrids. Shri P P S Pangali, Chairman UFEI discussed about the objectives of the organization and highlighted its initiatives.

Dr Anil Mehta, Professor of Agronomy at CCSHAU, Sirsa delivered a lecture on recent advances in cotton production technologies. Dr D Monga and Dr Rishi Kumar talked about cotton diseases, insect pests and their management. The farmers actively participated and shared their experiences in an open house discussion on the recent issue of whitefly incidence, losses and lessons for the future. This was followed by a field visit where CICR technologies were showcased. The farmers took keen interest in *desi* (*G. arboreum*) cotton varieties developed by the station.



Farmer's Training program cum exposure

A training programme cum exposure visit for the farmers adopted by the Ambuja Cement Foundation was organised on 10.11.2015. Twenty five participants including farmers and workers of foundation participated. Dr Rishi Kumar, Principal Scientist, CICR, delivered a lecture on whitefly management in cotton and other alternate hosts. The farmers visited the demonstrations on high density planting system in cotton and various *Desi* cotton genotypes.



Mera Gaon Mera Gaurav Programme

'Mera Gaon Mera Gaurav (My Village My pride)' programme launched by the Hon'ble Prime Minister on July 25, 2015 during 87th Foundation Day of ICAR and KVK conference at Patna has been initiated at CICR Nagpur from September 2015 with a view to hasten the process of Lab to Land. Under the scheme, as per the guidelines the scientists remain in touch with the adopted villages and provide information to farmers on technical and other related aspects in the time frame through personal visits and other means. ICAR- CICR along with its Regional Stations CICR, Coimbatore and CICR, Sirsa implementing the programme through the team of scientists; each team comprises of four scientists with five clusters of villages as per guidelines. Accordingly, 65 villages were adopted from 13 clusters villages i.e. eight, four and one respectively from Nagpur, Coimbatore and Sirsa and the lists of team comprising of Nodal Officer, Scientist's team and cluster villages adopted are as given in Table 5.2.2.1.

Table 5.2.2.1: CICR, Nagpur and Regional Stations Team of Scientists and Villages Adopted Base line survey

Team	Name of Scientists	Designation	Villages Adopted
Nodal Officer: Dr S. M. Wasnik, Principal Scientist, Extension			
CICR, Nagpur, Maharashtra			
1.	Dr. Sunil Rokde	Principal Scientist	Ganeshpur cluster, Wardha
	Dr. Punit Mohan	Principal Scientist	1. Ganeshpur
	Dr. G. Balasubramani	Principal Scientist	2. Digras
	Dr. J. H. Meshram	Scientist	3. Zadgaon 4. Belgaon 5. Borgaon (Sawli)
2.	Dr. R. B. Singandhupe	Principal Scientist	Parseoni cluster, Nagpur
	Dr. P. R. Vijyakumari	Principal Scientist	1. Narhar
	Dr. T. R. Loknathan	Principal Scientist	2. Kolitmara
	Dr. K. P. Raghavendra	Scientist	3. Nehra 4. Banera 5. Dhawalapur
3.	Dr. Nandini Narkhedkar	Principal Scientist	Girad cluster, Wardha
	Dr. M. Saravanan	Scientist	1. Jogingumpha
	Dr. Shailesh Gawande	Scientist	2. Shivanphal
	Dr. Joy Das	Scientist	3. Arvi 4. Faridpur 5. Mohgaon
4.	Dr. S. M. Palve	Principal Scientist	Nandura cluster, Wardha
	Dr. M. V. Venugopalan	Principal Scientist	1. Nandura
	Dr. V. Santhy	Senior Scientist	2. Nagapur
	Dr. V. S. Nagrare	Senior Scientist	3. Karanji (Bhoge) 4. Karanji (Kaji) 5. Pujai
5.	Dr. V. N. Waghmare	Principal Scientist	Hingna cluster, Nagpur
	Dr. H. B. Santosh	Scientist	1. Mangali
	Dr. Rakesh Kumar	Scientist	2. Mandavghorad
	Dr. Savitha Santosh	Scientist	3. Junewani 4. Nanda Khurd 5. Ukhali
6.	Dr. S. B. Nandeshwar	Principal Scientist	Godhani cluster, Umred, Nagpur
	Dr. Vinita Gotmare	Principal Scientist	1. Godhani
	Dr. A. Manikandan	Scientist	2. Mhasala
	Dr. Prabhulinga T.	Scientist	3. Mohpa 4. Sukali 5. Telkavads
7.	Dr. A. R. Raju	Principal Scientist	Kalmeshwar cluster, Nagpur
	Dr. J. Amudha	Senior Scientist	1. Sonegaon
	Er. G. Majumdar	Scientist	2. Pahi
	Dr. Anuradha Narala	Scientist	3. Ladai 4. Linga 5. Uparwahi

Team	Name of Scientists	Designation	Villages Adopted
Nodal Officer: Dr S. M. Wasnik, Principal Scientist, Extension			
CICR, Nagpur, Maharashtra			
8.	Dr. D. V. Patil	Senior Scientist	Navegaon cluster, Umred, Nagpur
	Dr. Sunil Mahajan	Senior Scientist	1. Navegaon Sadhu
	Dr. Chinna babu Naik	Scientist	2. Tirkhura
	Dr. Annie Sheeba	Scientist	3. Karhandla
			4. Thana
			5. Sev
CICR- Regional Station, Coimbatore, Tamil Nadu			
9.	Dr. N. Gopalakrishnan	Principal Scientist	Vadapudur Panchayat, Kinathukadavu block, Coimbatore District
	Dr. K.P.M. Damayanthi	Principal Scientist	1. Vadapudur
	Dr. K. Sankaranarayanan	Principal Scientist	2. Singaiyanpudur
	Dr. Isabella Agarwal	Principal Scientist	3. Sikkalampalayam
			4. Yelur
			5. Kallapuram
10.	Dr. K. Rathinavel	Principal Scientist	Sokkanur panchayat, Kinathukadavu block, Coimbatore district
	Dr. M. Amutha	Scientist	1. Sokkanur
	Dr. C. Karpagam	Senior Scientist	2. Muthugoundanpudur
	Dr. M. Sabesh	Scientist	3. Palapathy
			4. Veerappagoundanur
			5. Venkaiyagoundanpudur
11.	Dr. P. Nalayini	Principal Scientist	Kanjapalli Panchayat, Annur Block, Coimbatore District
	Dr. S. Manickam	Principal Scientist	1. Kanjapalli
	Dr. D. Kanjana	Scientist	2. Dhasarpalayam
	Dr. J. Gulsarbanu	Principal Scientist	3. Oothupalayam
			4. Kumaragounderpudur
			5. Neelagoundarpudur
12.	Dr. S.E.S.A.Khader	Principal Scientist	Allapalayam Panchayat Annur Block, Coimbatore District
	Dr. B. Dharajothi	Principal Scientist	1. Allapalayam
	Dr. R. Raja	Senior Scientist	2. Konarpalayam
	Dr. S. Usha Rani	Senior Scientist	3. Uthirampalayam
	Dr. Manivannan	Scientist	4. Mathireddypalayam
			5. Akravachengapalli
CICR- Regional Station, Sirsa, Haryana			
13	Dr O.P.Tuteja	Principal Scientist	1. Jhonpra
	Dr. R.A.Meena	Principal Scientist	2. Alleekan
	Dr. S.K.Verma	Principal Scientist	3. Nejadela Kalan
	Dr. Rishi Kumar	Principal Scientist	4. Rangari
			5. Begu

Base line survey

For assessing the ground realities and for base line survey, all the team had discussion with Panchayat President, Vice President, Ex. Vice President, Executive Secretary, Village Administrative Officer and other members and several farmers in the villages and collected the base line information of the villages for formulation and further implementation of strategies. Parseoni cluster in Nagpur district adopted villages are situated under forest area and dominated by tribal. The farmers are resources poor and are not in a position to adopt new technological interventions unless it is supported by the line department. Again, they are totally dependent on rainfall, on many occasions due to erratic distribution of monsoon rains their *kharif* crop suffers. Based on the exploration and discussion with various clients, each teams in cluster formulated the programme and following strategies for further implementation.

- To create awareness among the farmers about modern scientific agricultural practices especially for vegetable cultivation and dairy enterprises
- To create awareness among the farmers about sanitation, climate change, good agricultural practices
- Strengthen the interface with farmers by holding

regular meeting and visits in the villages

- To promote cotton cultivation in the study area
- To provide demand driven technical literature in local language for knowledge updating
- To create linkage with other organization and utilizing their services for development of the adopted MG-MG villages
- To create awareness among school children about various developmental programme of the government
- To provide regular technological back stopping for further development of the villages

Scientists-Farmers interactions

The various teams organize an interactive meet with farmers at MGMG villages and discussed current cropping scenario and related issues. Imparted training regarding collection of soil samples from the field for analysis to prepare soil health cards and also suggested control measures for insect pests of important crops including cotton. The farmers and scientists interacted on various issues related to insect pest management of agricultural, horticultural crops and animal husbandry issues. Large number of villagers including women actively participated in the seminar and discussion organised at different places.

