

Traveling workshop on Hybrid and Bt Cotton in India
21-26 November 2005

With the approval of ICAR, New Delhi, a Traveling workshop on Hybrid and Bt Cotton was held for participants of four Countries during 21 - 26 November 2005. The participants included:

1. Dr Ali Jafari, Head, Cotton Research Institute, Mofidabad, Iran
2. Dr Hakimjon Saydaliev, Head of Cotton Germplasm Deptt., Uzbek Cotton Breeding Institute, Tashkent, Uzbekistan
3. Dr M. Amir Helali, Administration of Cotton Research, General Commission for Scientific Agricultural Research, Aleppo, Syria
4. Dr Bayramgeldi Gurtgeldiyev, Principal Cotton Specialist, Ministry of Agriculture, Turkmenistan

Dr O. M. Bambawale, Principal Scientist and Mr U. R. Sangle, Research Associate, National Centre for Integrated Pest Management, ICAR, New Delhi accompanied the participants during the Traveling Workshop and interacted with them technically on IPM in hybrid and Bt cotton and facilitated their visit to different Institutions in India. Mr Sanjay Deshpande AGM (Public Relations & Coordination), Mahyco Seeds Ltd, New Delhi also accompanied the participants to achieve harmonious interactions.

A broad itinerary was chalked out by Dr C. D. Mayee, Chairman, Agricultural Scientists' Recruitment Board, New Delhi (Annexure I) for the Traveling Workshop in a way to expose the participants to all the three major cotton growing zones of India with respect to the hybrids and Bt scenario. The plan was rigorously executed in totality. The details of the activities to be undertaken by the participants were developed by respective laboratories and are enclosed (Annexure II - a, b, c & d). A summary of the training imparted follows.

Nov. 19-20: Assembled at New Delhi and briefing of the programme.

November 21:

Visit to National Agricultural Science Museum – The Saga of Indian Agriculture

The participants visited the Agricultural Museum at NASC Complex, New Delhi and got acquainted with the developments of agriculture in India and present State of the art technology in the country with a futuristic projection. They also understood profiles of different crops grown, cotton production zones, climates, soils, farming communities and their cultures etc.

Visit to NCIPM, New Delhi

The participants visited National Centre for Integrated Pest Management, IARI Campus, New Delhi on got exposed to IPM modules of different crops including cotton, various expert systems, Pest Management Information

Systems and On-Line Monitoring. They were each provided with a set of NCIPM publications with a good amount of information on cotton and Bt cotton IPM and a set of CDs of two cotton IPM films produced by NCIPM (success story of Ashta Community project on cotton IPM and IPM in cotton).

The Group proceeded for Central Institute for Cotton Research Regional Station, Sirsa, Haryana State around 1.30 pm and was also accompanied by Dr D Monga, Head of the CICR Station. On way to Sirsa, about 260 km from New Delhi, the trainees had a good interaction with the resource persons and were familiarized with the Indian cotton growing conditions and culture.

November 22:

Visit to CICR Regional Station, Sirsa

Orientation

The participants were oriented on cotton scenario in the North Zone of India, the concept of hybrid cotton, the industrial hybrid seed production, the GMS based seed production, costs involved, production of seed per hectare and comparison of hybrids with varieties. Diversity of cotton cultivation with respect to the species of *Gossypium* grown in different parts of the country, varieties, inter and intra specific hybrids grown were all properly informed. The presentations were followed by discussions and several queries of the trainees were addressed.

Visit to CICR Experimental fields

Although by November almost all the pickings of cotton are over in the North Zone for sowing of wheat, picking in several important field experiments were delayed for the participants to get a proper perception about the yield levels attained, performance of hybrids / Bt cotton and the

quality aspects of lint. Notable plots visited included : CICR hybrids, Screening Nursery for Cotton Leaf Curl Virus, performance of Bt hybrid RCH - 134, museum of all the six released Bt hybrids of the North, All India Coordinated Cotton Improvement Project (AICCIP) Bt cotton hybrid trials on Bollgard I and II and GMS based hybrids. GMS based *G. Arboreum* hybrid CISAA-2 hybrid developed by CICR, Sirsa is getting popular with the farmers and farmers themselves are producing the seed and getting additional income. The participants took keen interest all through the visit. Various steps in the production of hybrid seed (first day afternoon - emasculation and next day forenoon fertilization, identification marks etc.) were demonstrated practically.

Visit to CICR and CIRCOT Laboratories

A brief visit was made to acquaint the participants to various laboratory activities of the center including molecular characterization of CICuV virus and *Rhizoctonia solani* strains. Fiber testing facility of CIRCOT Regional Station were shown. The participants appreciated the performance of the tests and noted down the address of the unit manufactured by an Indian company, which is found to be cost effective for their respective countries.

Visit to farmers' Bt cotton fields in two villages of Sirsa District

Mr Sandeep Kumar, territory Manager, Monsanato India Ltd. accompanied the delegates to two villages - Neja Dela Kalan and Jhopra in distt. Sirsa to show the performance of Bt RCH 134 cotton hybrid of Rasi Seeds and Bt MRC 6301 cotton hybrid of Mahyco Seeds Ltd. The delegates interacted with the farmers and took notes on various aspects of Bt cotton cultivation such as seed rate, spacing, fertilizer dosages and other plant protection aspects.

The farmers were expecting better yields from Bt cotton to the extent of 40-50 q /ha compared to 30-35 q/ha in the conventional cotton hybrids.

November 23:

Visit to IPM and IRM villages adopted by CICR Regional Research Station, Coimbatore

After reaching Coimbatore in the forenoon of November 23, the delegates visited Chinnakanoor and adjoining IPM and IRM villages adopted by CICR Coimbatore from 2.00 to 6.00 pm. In these villages, production technologies under Front Line Demonstrations, IPM and IRM were shown. Two plant Health Clinics were visited which displayed charts and photographs of various pests, natural enemies, IPM and IRM interventions and performance of these technologies. Two Bt cotton fields of RCH -20 Bt and MRC 6918 Bt hybrids were visited in these villages where the farmers interacted with the delegates. The performance of Bt hybrids was compared with the local hybrids.

The delegates could also see the seed cotton produce heaped in the house of a villager and could compare the superior seed cotton quality of Bt cotton with the poor quality of non-Bt cotton hybrids. The non-Bt hybrids yielded almost 30 per cent bad kapas whereas the quality of Bt cotton was uniformly better with effective protection from pink bollworm.

November 24:

Visit to CICR Regional Research Station, Coimbatore

Orientation

Dr Gururajan, Head, CICR Regional Research Station, Coimbatore gave orientation towards cotton cultivation details of the South Zone growing all

the four cultivated species of *Gossypium* - inter and intraspecific hybrids and varieties almost round the year. Various plant types of inter and intraspecific hybrids and the diploids were exhibited in their museum. As a result of the introduction of *Verticillium* tolerant variety MCU-5 VT the disease problem has been largely overcome, he explained. Dr Amir of Syria showed interest to have the *Verticillium* tolerant cultures for testing in his country. Scientist from CICR Station interacted with the delegates and answered their queries.

Visit to Experimental Fields

The field experiments on plastic mulch with drip irrigation evoked much response as the technology is proving to be practical and useful in radically improving the yields and conserving moisture. Similarly, experiment on sorghum- cotton rotations and impact of sorghum on cotton yields also generated interest amongst the delegates. The Interspecific hybrids, germplasm and breeding trials, Bt cotton trials etc. were shown. The hybrid seed production procedure was demonstrated by field workers and there was detailed discussion on various aspects of hybrid seed production.

At the end of the field visit, the delegates were provided with the cotton publications from CICR, Coimbatore that included a technical bulletin on Nucleus and Breeder seed production manual useful to the trainees.

November 25:

Visit to Research Facility of Mahyco Life Sciences Research Centre

Dr Brent Zehr, Director of Research, Maharashtra Hybrid Seeds Co. Ltd gave an orientation through a slide presentation on overview of MAHYCO activities and Bollgard Bt cotton in India. He told about handling of over 30

crops such as cereals, oilseeds, cotton, and vegetables by the company and the development of new products such as hybrids in rice, wheat, mustard, pigeon pea, safflower, Bt transgenic cotton and vegetables with the R & D mission of providing economic benefit to farmers and end-users through value enhanced seed (hybrid crops). The other aspects of the presentation covered transgenic technology focus on insecticidal genes, viral and fungal disease resistance genes and herbicide tolerance genes (cotton and wheat); Bt bollgard regulatory process in India, the two gene Bollgard II Bt etc. It was followed by lab visit on various aspects of transgenic development and bioassay/molecular testing of Bt. The germplasm bank of the center is maintained at 18⁰ C and 35 % RH constant throughout the year. The long-term storage facility at minus temperatures is also being contemplated but is not very practical, Dr Zehr informed. The delegates took high interest and got all the information requested in germplasm maintenance. MAHYCO presented the delegates with a good number of their publications on hybrid seed production and Bt cotton.

Visit to Bollgard II Bt hybrid fields at village Sillod

Mahyco got permission to have large-scale performance trials at 80 villages in the central zone from GEAC for the year 2005-06 and a village (Sillod) where one such trial was in progress was visited. In this trial one Bollgard I Bt (with Cry IAc protein), one Bollgard II Bt hybrid (with Cry IAc and Cry 2Ab protein) and a local popular hybrid cotton check (Hybrid Bunny) were grown in one acre. Bollgard II Bt out-performed both Bollgard I Bt and the non-Bt conventional hybrid. There was damage due bollworms as many fruiting points were empty in non-Bt cotton and pink bollworm infestation could also be seen. The farmer had nearly 3000 farmer visitors during the season from adjoining places to see the high performance of Bollgard II. The delegates interacted with the farmers and were convinced about the utility

of Bt cotton in managing bollworms and the better performance of Bollgard II Bt.

November 26:

National dialogue on Resurgence of Cotton, CIRCOT, Mumbai

Dr C.D. Mayee, President, Indian Society of Cotton Improvement, Mumbai in collaboration with Mr Bhagirath Chaudhary, National Coordinator, International Service for the Acquisition of Agri-Biotech Applications (ISAAA), organized a one day National Dialogue on "Resurgence of Cotton" at Central Institute for Research on Cotton Technology, Mumbai on 26 November so as to coincide with the visit of the INCANA delegation. The agenda of the National Dialogue (Annexure III) provided ample exposure to the delegates on present scenario and future trends in cotton production, export and import of cotton, and improving competitiveness of cotton fiber and byproducts. A base paper on cotton production, Technology Mission and need for paradigm shift by the Society gave very good foundation. A documentary on Bt cotton produced by Mr Chaudhary, ISAAA was released and screened. The participants interacted with Dr B.M. Khadi, Director, Central Institute for Cotton Research, Nagpur and Dr C.D. Mayee on this occasion and briefed them about their Traveling Workshop visit. Dr Khadi assured to send the participants a set of the publications of CICR, Nagpur by surface mail.

The delegates visited the museum of CIRCOT where the activities of the institute are presented. CIRCOT also provided a set of their publications to the participants. Copies of three more books (Handbook of cotton in India, Cotton physiology and cotton diseases) published by ISCI were provided to the participants.

The participants departed from Mumbai in the evening of 26th November for their respective countries via New Delhi.