

REPORT

on

SINO-PAK INTERNATIONAL CONFERENCE ON INNOVATIONS IN COTTON BREEDING AND BIOTECHNOLOGY

November 22-24, 2017



**Muhammad Nawaz Shareef University of Agriculture
MULTAN, PAKISTAN**

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EXECUTIVE SUMMARY

In pursuance of establishing international relations to reach out for new technologies for enhancing Cotton production in Pakistan, Muhammad Nawaz Shareef University of Agriculture, Multan (MNS-UAM) in collaboration with Biotechnology Research Institute, Chinese Academy of Agricultural Sciences (BRI, CAAS), Beijing, China and Department of Plant Breeding and Genetics, Bahauddin Zakariya University (BZU), Multan organized first “Sino-Pak International Conference on Innovations in Cotton Breeding and Biotechnology” during November 22-24, 2017. The conference provided a pragmatic platform to discuss challenges faced by cotton crop and innovative technologies to address these challenges to ensure higher average cotton productions. The inaugural session of the conference was held on November 22, 2017 in the afternoon. Prof. Dr. Asif Ali, Vice Chancellor, MNS University of Agriculture Multan welcomed distinguished national and international speakers and participants followed by address by Dr. Noor-Ul-Islam, Chief Executive Punjab Agriculture Research Board (PARB); Prof. Dr. Rui Zhang, BRI, CAAS and Chief Guest Prof. Dr. Tahir Amin, Vice Chancellor, Bahauddin Zakariya University, Multan. The conference proceeded for the second and third day comprising technical sessions at three different venues:

- (i) MNS University of Agriculture, Multan
 - a. *Cotton Sustainable Production and Biotechnology*
 - b. *Cotton Seed Supply Chain and Regulations*
 - c. *Characterization of Germplasm for Abiotic and Biotic Resistance*
- (ii) Central Cotton Research Institute (CCRI), Multan
 - a. *Cotton Genomics and Transgenics*
 - b. *Cotton Genome Editing*
- (iii) Bahauddin Zakariya University, Multan
 - a. *IPM and Climate Change Impact on Cotton Production*
 - b. *Gene Characterization in Cotton*

The technical sessions covered all the major problems and their proposed solutions pertaining to cotton production in Pakistan as well as globally. A number of renowned foreign and local scientists delivered talks during technical sessions.

The foreign scientists included Prof. Dr. Rui Zhang (China), Prof. Dr. Dehu Liu (China), Prof. Dr. Yanmin Wu (China), Dr. Yiqin Wang (China), Dr. Chengzhen Liang

(China), Dr. Huiming Guo (China), Dr. Zhanmin Sun (China), Ms. Wenfang Guo (China), Dr. Zhongxu Lin (China), Dr. Siva K. Balasundram (Malaysia) and Dr. Tahira Fatima (USA) while the local scientists included Dr. Abid Mehmood (DG Agriculture Research, Punjab), Dr. Shahid Mansoor (Director, NIBGE), Dr. Zahid Mehmood (Director, CCRI, Multan), Dr. Saghir Ahmed (Director Cotton, Punjab), Prof. Dr. Zulfiqar Ali (Director, ORIC, MNSUAM), Dr. Zafar Iqbal (Director, Agriculture Biotechnology Research Institute, ABRI, AARI) and other young scientists from all over Pakistan.

The young scientists presented their research findings through poster presentations. The poster of Dr. Abdul Rehman entitled “Assessment of upland cotton for water stress conditions” was awarded the best poster presentation. The public and private partners graciously sponsored the conference. The conference ended with a vote of thanks by Prof. Dr. Asif Ali. The conference was a successful event and scientists, present in the conference, pledged to organize conference every year with an aim to increase cotton production. The MNS University of Agriculture, Multan has laid foundation for concrete and sustainable efforts to uplift the cotton, main driver of Pakistan’s economy, in collaboration with Biotechnology Research Institute, Beijing, China along with local collaborating institutions of Pakistan. In this context, Prof. Dr. Zhang Rui, Director Cotton Molecular Breeding Lab, Biotechnology Research Institute CAAS (China) and Dr. Abid Mehmood, Director General (Research) Punjab inaugurated a Sino-Pak Agri-Biotechnology Laboratory at MNS-University of Agriculture Multan on November 24, 2017. Moreover, a trilateral memorandum of understanding was signed between MNS University of Agriculture, Multan, Ayub Agricultural Research Institute Faisalabad and Biotechnology Research Institute (BRI), Beijing, China. The MoU has underpinned the output-oriented collaboration between Chinese and Pakistani researchers in cotton, which could serve as an excellent model to be replicated in other major crops eventually benefiting both China and Pakistan.

The sessions were presided over by the scientists who drafted final recommendations for each technical session conducted after thorough discussion. The recommendations were presented by the session chairs individually. The brainstorming sessions yielded refined measures proposed to be adopted at-large by every stakeholders of cotton production chain. The cotton community along with the international scientists, after intense deliberations, drafted recommendations to set the future course of action in order to maximize cotton production. The recommendations emphasized on provision of certified seeds to farmers, mechanical picking, employing smart agriculture practices, breeding climate smart varieties,

establishing efficient cotton transformation systems, exploring new genes inculcating resistance against insect pests and pathogens, implementing GM regulations properly, efficient Bt toxin testing, balanced use of nutrients, effective integrated pest management strategies to cope with Pink bollworm menace and latest bio-technologies like RNAi and genome editing. Pakistan is in dire need of implementing the proposed recommendations because of changing climatic conditions, ever increasing insect pests' pressure and diseases. Details of these recommendations is given below:

RECOMMENDATIONS

- Provision of **certified cotton seed** to farming community.
- **Mechanical picking** should be encouraged to overcome problem of labor shortage.
- Take measures of clean picking to get **clean cotton**.
- The **integrated pest management (IPM)** for Pink bollworm control experimented by the entomologists of MNS University of Agriculture Multan, involving PB ropes should be replicated and adopted as an effective IPM strategy in cotton belt.
- Adopting new concept of cotton sowing in **ultra-narrow row (UNR) spacing** with nitrogen application @ 150 kg/ha is technologically and economically sustainable and managed method for the farmers to get maximum seed cotton yield and profit.
- Adoption of **Precision Agriculture** practices would help to apply proper agricultural inputs to grow more crops in a wide range of soil environments.
- True potential of **genetic engineering** should be exploited like;
 - Incorporation of herbicide tolerance like glyphosate should be encouraged.
 - Incorporation of multigenic transgenic resistance is more durable than monogenic resistance in combating abiotic stresses.
 - Cotton Resistant (R) genes could be regulated to modulate plant immunity in combating various biotic and abiotic stresses.
 - Vascular Specific Promoter should be employed in incorporating resistant against vascular feeding sucking insect pests of cotton.

- Advanced technologies like RNAi and genome editing (ZFN's, Tallens and CRISPR Cas) should be coupled with conventional breeding in order to achieve durable resistance against Cotton Leaf Curl Disease and other biotic stresses.
- Databases such as Cotton Functional Genomics Database can serve as an effective tool to exploit genetic resources for improvement of cotton fiber quality and yield.
- To ensure the safe use of GM crops, biosafety risk assessment measures are required as an important part of the regulatory oversight of such products.
- Establishment of a uniform protocol for *Bt* toxin testing in cotton that is a prerequisite to prevent the sale of *Bt* varieties with low toxin level.
- *Calotropis procera* is a potential plant for improving cotton fiber due to its increased fiber length.
- *Gastrodia* antifungal proteins (GAFP) have a promising potential against cotton wilt caused by *Verticilium dahliae*. Various sources of anti-pathogenic proteins should be exploited against cotton wilt. The *Verticilium* wilt resistant Cotton transgenics, developed by Chinese scientists, should be tested against the Pakistan's isolates of *Verticilium* and *Fusarium* wilt.
- Cotton breeding programs must screen root infecting fungi and nematodes simultaneously. Rugby, Cartap, Nativo and Axiom should be used to manage Cotton root rot disease complex caused by *Rhizoctonia bataticola* and *Meloidogyne incognita*.

TECHNICAL SESSIONS*Venue: MNS University of Agriculture, Multan***Session 1. Cotton Sustainable Production and Biotechnology**

Chair: Dr. Noor-ul-Islam, CEO PARB

Co-chair: 1) Dr. Khalid Abdullah 2) Dr. Tahira Fatima

Time	Scientist Name	Topic
09:00 AM	Prof. Dr. Rui Zhang	Cotton FGD (Cotton Function Genomics Database) and two case studies in cotton genomics research
9:20 AM	Dr. Siva K. Balasundram	Precision in agriculture strategies for sustainable management of crop and soil
9:40 AM	Prof. Dr. Dehu Liu	Transgenic Cotton against <i>Verticillium dahliae</i> by over expression of HEWL in plant
10:00AM	Prof. Dr. Yanmin Wu	Over expression of the HhERF2 and PeDREB2a Genes Enhanced Tolerances to Salt and Drought in Transgenic Cotton
10:20 AM	Dr. Shahid Mansoor	Cotton Biotechnology for control of insects and weeds
10:40 AM	Dr. Zahid Mehmood	Contribution of CCRI Multan for cotton research and development in Pakistan

Session 2. Cotton Seed Supply Chain and Regulations

Chair: Dr. Zhang Rui, BRI China

Co-chair: 1) Dr. Irfan Ahmed Baig 2) Dr. Ghazanfar Ali Khan

Time	Scientist Name	Topic
11:30 AM	Dr. Saghir Ahmed	Introgression of CLCV resistant/tolerant genes from <i>G. arboreum</i>
11:50 AM	Dr. Tahira Fatima	Biosafety and Regulation of GM crops
12:10 PM	Dr. Zulfiqar Ali	Status of nutritional elements in leaves of cotton cultivars and soils growing in cotton belt
12:30 PM	Dr. Shaukat Ali	Role of Intellectual Property Rights in promotion of Technology Innovations
12:50 PM	Dr. Huma Saleem	Evidence of diversification of alpha-satellites associated with cotton leaf curl disease
1:10 PM	Mr. Umar Iqbal	Probing the cotton seed supply chain in Pakistan

Venue: Central Cotton Research Institute, Multan

Session 1. Cotton Genomics and Transgenics

Chair: Dr. Abid Mahmood, DG (Research) Punjab

Co-chair: 1) Dr. Ishtiaq Ahmad Rajwana 2) Dr. Saghir Ahmad

Time	Scientist Name	Topic
9:00 AM	Dr. Yiqin Wang	Significant improvement of cotton <i>verticillium wilt</i> resistance by manipulating the expression of <i>Gastrodia antifungal</i> proteins
9:20 AM	Dr. Aftab Bashir	Identification of fiber development specific genes and the prospects for their direct transformation in elite cotton cultivars
9:40 AM	Dr. Zafar Iqbal	Trend of Cry1Ac toxic protein accumulation in candidate <i>Bt</i> cotton genotypes of Pakistan
10:00 AM	Dr. Chengzhen Liang	Co-expression of <i>GR79 EPSPS</i> and <i>GAT</i> yields herbicide-resistant cotton with low glyphosate residues
10:20 AM	Dr. Masooma Naseer Cheema	Transgenic cotton cultivation in Pakistan: Challenges and opportunities
10:40 AM	Dr. Shahid Nazir	<i>In-planta</i> genetic transformation of synthetic herbicide tolerant gene in upland cotton

Session 2. Cotton Genome Editing

Chair: Dr. Dehu Liu

Co-chair: 1) Dr. Siva Balasundram 2) Dr. Aftab Bashir

Time	Scientist Name	Topic
11:30 AM	Dr. Huiming Guo	Using genetic engineering to improve cotton resistance in abiotic stress
11:50 PM	Dr. Zhanmin Sun	Simultaneous Overexpression of the PeDREB2a and KcERF Genes Enhanced Tolerances to Salt and Drought in Transgenic Cotton
12:10 PM	Ms. Wenfang Guo	Transgenic cotton against aphids by over expression of snowdrop lectin and amaranth lectin
12:30 PM	Dr. Aftab Ahmad	Suppression of begomo viruses using CRISPR/Cas9 with multiple gRNAs
1:00 PM		Lunch Break
2:00 PM	Ms. Sabin Aslam	An Improved Protocol of Cotton

		Transformation Using DS-Red
2:20 PM	Dr. Zulqarnain Haider	TALEN-mediated disruption of <i>ACI</i> gene and gene regulatory region for inhibition of replication of begomo viruses
2:40 PM	Mr. Abdul Manan	Comparison of CIS acting elements contributing in gene expression and miRNA mediated R-gene silencing to regulate plant immunity in <i>G. arboreum</i>
3:00 PM	Mr. Latif ur Rahman	FreB is involved in the ferric metabolism and multiple pathogenicity-related traits of <i>Verticillium dahliae</i>
3:20 PM	Dr. Nadia Iqbal	Sequence analysis and expression study of Lipid transfer protein (LTP7) promoter isolated from cotton (<i>Gossypium hirsutum</i> L.)

Venue: Bahauddin Zakariya University, Multan

Session 1. IPM and Climate Change Impact on cotton Production

Chair: Dr. Zhongxu Lin

Co-chair: 1) Dr. Shafqat Saeed 2) Dr. Muhammad Razzaq

Time	Scientist Name	Topic
09:00 AM	Dr. Arshad Shakeel	IPM of pink boll worm (<i>Pectinophora gossypiella</i>) on cotton
09:20 AM	Dr. Abid Ali	Interaction of natural enemy species attacking cotton aphid in Chinese <i>Bt</i> cotton ecosystem
09:40 AM	Dr. M. Ishtiaq	Status of pink boll worm (<i>Pectinophora gossypiella</i>) on transgenic cotton and its management
10:00AM	Syed Muhammad Zaka	Development, survival and predating potential of <i>Antilocbus coquebertii</i> (Hemiptera: Pyrrhocoridae) on the <i>Dysdercus keonigii</i> F.
10:20 AM	Dr. Unser Naeemullah	Modern techniques to control insect pests on cotton; A Review
10:40 AM	Muhammad Waqas Yonas	Biological control of cotton mealy bug (<i>Phenacoccus solenopsis</i>) in Pakistan
11:00 AM	Muhammad Rafiq Shahid	Assessment of cotton seed bug, <i>Oxycarenus laetus</i> Kirby damage in transgenic and non-transgenic genotypes of cotton
11:20 AM		Tea Break
11:45 AM	Dr. Habib ur Rahman	Exploring climate change projections and impacts for cotton production using multi-

		GCMs and RCPs in cotton zone of Punjab-Pakistan
12:00 PM	Ms. Sibgha Noreen	Does exogenously applied osmoprotectants can alleviate the adverse effects of drought stress on Cotton (<i>Gossypium hirsutum</i> L.)
12:15 PM	Dr. Muhammad Abubakar	Improvement in the socio-economic and health status of female cotton pickers under the changed scenario of <i>Bt</i> cotton adoption in the cotton belt
12:30 PM	Dr. Mirza Abdul Qayyum	Fluctuation of white fly and thrips populations in Multan correlating with climatic factors
12:50 PM	Dr. Nazim Hussain	Applied Nitrogen in the soil ensured in increasing the cotton plant populations and yields under Ultra Narrow Row (UNR) spacing method
1:10 PM	Dr. Abdul Sattar	Foliar applied silicon improves the growth, boll retention, lint yield and quality of cotton

Session 2. Gene Characterization in Cotton

Chair: Dr. Zafar Iqbal

Co-chair: 1) Dr. Tassawar Hussain Malik 2) Dr. Abdul Qayyum

Time	Scientist Name	Topic
2:30 PM	Dr. Zhongxu Lin	In silico analysis discovered evolutionary footprints for short repeats and transposons based gene expression modulation in <i>G. hirsutum</i>
2:50 PM	Dr. Allah Baksh	Confining Insecticidal Gene Expression to Insect Wounding Parts in Transgenic Cotton
3:10 AM	Dr. Shahnawaz –ur-Rehman	Geographical distribution, diversity and host interaction of cotton leaf curl Multan betasatellite in the Old World
3:30 PM	Dr. Muhammad Asif Saleem	EST-SSR based Analysis Revealed Narrow genetic base of in-use cotton varieties of Pakistan
3:50 PM	Dr. Amir Shakeel	Assessment of genetic diversity in <i>Bt</i> cotton germplasm

Venue: MNS University of Agriculture, Multan

Session 1. Characterization of germplasm for abiotic and biotic resistance

Chair: Dr. Iqrar Ahmad Khan

Co-chair: 1) Dr. Yanmin Wu 2) Dr. Zahid Mehmood

Time	Scientist Name	Topic
09:00 AM	Dr. Fiaz Ahmad	Heat tolerance in cotton cultivars: Physiological and morphological aspects
09:20 AM	Dr. Xiaofeng Su	Improving <i>verticillium wilt</i> resistance of cotton by HIGS
09:40 AM	Dr. Waqas Malik	Genetic analysis for boll weight, fiber quality, cellulose and flavonoids contents in Bt and non-Bt colored cotton
10:00 AM	Dr. Tehseen Azhar	Potential of <i>Gossypium hirsutum</i> L. for breeding against water stress conditions
10:20 AM	Dr. M. Farrukh Saleem	Evaluating the dynamics of foliar applied silicon at various growth stages of heat stressed cotton (<i>Gossypium hirsutum</i> L.)
10:40 AM	Dr. Muhammad Arslan Khan	Management of potential root scathe Pathogens (<i>Meloidogyne incognita</i> and (<i>Rhizoctonia bataticola</i>) in cotton

INAUGURAL SESSION

The Muhammad Nawaz Shareef University of Agriculture, Multan (MNSUAM) organized first Sino-Pak conference on Innovations in Cotton Breeding and Biotechnology from November 22-24, 2017 in collaboration with Biotechnology Research Institute (BRI), Chinese Academy of Agricultural Sciences (CAAS) and Bahauddin Zakariya University, Multan (BZUM). The conference was organized to identify the solutions of challenges cotton crop is facing. A team of Chinese scientists led by Dr. Rui Zhang from BRI, CAAS came to attend the conference along with scientists from USA and Malaysia.



The conference's maiden session was held at MNSUAM on 22nd November at 03:30 pm succeeded by technical sessions on November 23-24 at MNSUAM, Central Cotton Research Institute (CCRI) and BZU, Multan. The session chairs presented the recommendations at the end of their respective technical sessions. Before the start of maiden session, guests visited the stalls setup by agriculture based companies and appreciated the efforts of private sector in enhancing cotton production in Pakistan.

Welcome address by Vice Chancellor

The Vice Chancellor, MNSUAM Prof. Dr. Asif Ali warmly welcomed everyone at



the conference especially the foreign scientists Prof. Dr. Rui Zhang and her team, Dr. Tahira Fatima, Purdue university USA and Dr. Silwa, Putra university Malaysia. The Vice Chancellor briefed about the academic and infrastructural development of MNSUAM particularly national and international collaborations of the university. Prof. Dr. Asif Ali emphasized on improving the educational system and highlighted the need of activity and research oriented systems. He further narrated the importance of cotton crop in Pakistan's economy and assiduous efforts are required for sustainable cotton production. He expressed heartiest gratitude to the public and private sponsors of the conference especially Chinese Academy of Agricultural Sciences.

Address by Dr. Noor-ul-Islam

Dr. Noor-UI-Islam is a CEO of Punjab Agriculture Research Board and a cotton breeder. While speaking on the inaugural session, he summarized the challenges faced by cotton crop in Pakistan and worldwide. He told the audience about the problems hampering cotton production in Pakistan which mainly involved insect pests like Pink bollworm and whitefly, Cotton leaf curl disease caused by begomoviruses, weeds and heat stress. Dr. Islam



further underlined the need to adopt latest technologies to get the targeted cotton yield of 18 million bales. He told about the PARB funded project run by Punjab university based on RNAi technology costing Rs. 30 million but it didn't yield promising results as expected. He hoped to bridge the technological gap by the help of Chinese scientists. He pledged full support from the PARB and advised to focus projects which could benefit farmer's community. He wished good luck for conference and applauded the efforts of Prof. Dr. Asif Ali in overall improvement of agriculture sector specifically cotton crop.

Address by Dr. Rui Zhang

Dr. Rui Zhang is a senior researcher in Biotechnology Research Institute, Chinese Academy of Agricultural Sciences. She graced the conference through active participation in conference along with her team of scientists. During her talk, she highlighted the challenges faced by cotton crop in China and role of BRI in combating these challenges. She told the audience about the achievements of her institute and current research work going-on in her labs. She expressed thanks to Prof. Dr. Asif Ali and appreciated his efforts for holding the conference.



Address by Chief Guest

Prof. Dr. Tahir Amin, Vice Chancellor, BZU, Multan was the chief guest at inaugural session. Dr. Amin is a political scientist and has deep insight of international relations. He applauded the rise of MNSUAM in a very short span and greatly appreciated the efforts of Prof. Dr. Asif Ali in making Multan as a hub of agricultural activities in Punjab. He congratulated Vice Chancellor, MNSUAM for arranging a splendid conference and taking BZU, Multan in loop as a collaborating partner. He shared his experience regarding stay in China and termed it an unique experience. Dr. Amin focussed on exploring the opportunities in China-Pakistan Economic Corridor (CPEC) which could revolutionize the agriculture sector of Pakistan.



The other speakers were Mr. Mazhar Abbas Raan, Member Provincial Assembly, Punjab; Prof. Dr. Aftab Bashir, Forman Christian College University, Lahore; Prof. Dr. Ishtiaq Ahmad Rajwana, Dean Faculty of Agriculture and Environmental Science, MNSUAM and Dr. Abdus Salam Khan, Pricipal Burewal campus, University of Agriculture, Faisalabad. They all emphasized for combating biotic and abiotic factors Limiting Cotton production along with right policy decisions at government level.

POSTER PRESENTATIONS

The young scientists working on Cotton presented their work in form of posters. Dr. Rui Zhang, Dr. Tahira Fatima and Dr. Tassarwar Hussain Malik evaluated the posters in terms of quality of research work and presentation. After the thorough evaluation, following posters were awarded first, second and third positions.



1. Assessment of upland cotton for water stress conditions.
2. Response of cotton germplasm against root zone salinity under field conditions.
3. Genome wide analysis characterization and functional aspects of BRI 1 gene family during fiber development in cotton genomes.

The below mentioned table shows the research title and presenter's name of the poster presentations.

Sr. No.	Title	Presenter
1.	Real time PCR: A tool for expression profiling of cotton fiber genes	Dr. Nadia Iqbal
2.	Screening of cotton germplasm for improved potassium uptake efficiency at different supply levels	Mr. M. Naeem Akhtar
3.	Screening of genotypes with improved phosphorous uptake using symbiotic fungus in cotton	Mr. Muhammad Salman
4.	Optimization of regeneration protocol of some elite cotton cultivars	Ms. Hira Maryam
5.	A review of artificial diets for mass culture of pink bollworm <i>Pectinophera gossypiella</i> saunders a destructive insect pest of cotton	Mr. Furqan Ahmad
6.	Half diallel analysis in upland cotton under normal and water deficit condition	Mr. Muhammad Arslan
7.	Assessment of upland cotton for water stress conditions	Dr. Abdul Rehman
8.	Heterosis estimate for seed cotton yield and physiological traits under normal and water deficit conditions in Cotton	Mr. Waqas Shafqat
9.	The study of genetic variability for drought tolerance in Cotton	Mr. Aziz Ullah
10.	Response of Cotton germplasm against root zone salinity under field conditions	Mr. Furqan Ahmad
11.	Hirsutinization of Asiatic Cotton for insect pest complex morphological, agronomic and quality traits	Mr. Muhammad Kashif
12.	Genetic variability in proline its relationship with yield and yield parameters of cotton cultivars grown under water stress condition	Mr. Muhammad Kashif
13.	Exogenous application of growth regulators improved the productivity of cotton cultivars under different row spacing	Dr. Azra Yasmeen
14.	Comparative field efficiency of different insecticides against cotton thrips population at district Muzaffar Garh, Pakistan	Mr. Muhammad Irshad
15.	Genome wide analysis characterization and functional aspects of BRI 1 gene family during fiber development in cotton genomes	Ms. Anam Qadir Khan

CONCLUDING SESSION

In the concluding session of the conference on 24th November, 2017, the chairs of technical sessions presented the recommendations relevant to their respective sessions succeeded by the talks of Dr. Abid Mehmood and Prof. Dr. Asif Ali.

Address by Dr. Abid Mehmood

Dr. Abid Mehmood, Director General Agriculture Research Punjab, while speaking in the concluding session congratulated Prof. Dr. Asif Ali for organizing such a marvelous conference. He further emphasized on acquiring new technologies for cotton yield improvement, provision of quality cotton seed to farmers and soil improvement. He ended his speech by appreciating Prof. Dr. Asif Ali for making Multan a hub of agriculture activities in Punjab.

Address by Prof. Dr. Asif Ali

The Vice Chancellor, MNSUAM, Prof. Dr. Asif Ali thanked everyone especially the Chinese scientists who came a long way to make this conference successful. The Vice Chancellor applauded the support of government research institutions and private sector firms for holding Sino-Pak International Conference on Innovations in Cotton Breeding and Biotechnology. Prof. Dr. Asif Ali emphasized to acquire latest cotton crop improvement technologies from China. The Vice Chancellor said that a foundation has been laid through this conference for bilateral Sino-Pak scientific collaboration in improving cotton which will be followed by Material Transfer Agreement (MTA), exchange of research scientists and holding of conference on yearly basis. Prof. Dr. Asif Ali congratulated everyone on successful completion of conference.

Distribution of Souvenirs

The invited speakers, oral presenters along the top three poster presenters were awarded with shields and certificates by Prof. Dr. Asif. Ali and other guests.

LIST OF PARTICIPANTS

Sr. No.	Name	Department/Affiliation	Status
1	Prof. Dr. Rui Zhang	Biotech/CAAS	Head CBL
2	Prof. Dr. Dehu Liu	BRI/CAAS	Professor
3	Prof. Dr. Yanmin Wu		
4	Dr. Yiqin Wang	IGDB/CAAS	Associate Professor
5	Dr. Chengzhen Liang	BRI/CAAS	Assistant Professor
6	Dr. Huiming Guo	CAAS	Associate Professor
7	Dr. Zhanmin Sun	BRI/CAAS	Assistant Professor
8	Ms. Wenfang Guo	BRI/CAAS	PhD
9	Dr. Zhongxu Lin		
10	Dr. Siva K. Balasundram	AT/UM	Associate Professor
11	Dr. Tahira Fatima	HORT/PURDUE	Associate Professor
12	Dr. Abid Mehmood	AARI	DGA (Research)
13	Dr. Shahid Mansoor	NIBGE, Faisalabad	Director
14	Dr. Saghir Ahmad	CCRI, Multan	Director
15	Dr. Zahid Mehmood	CRI, Multan	Director
16	Prof. Dr. Zulfiqar Ali	PBG/MNS-UAM	Chairman
17	Dr. Zafar Iqbal		
18	Dr. Aftab Bashir		
19	Dr. Latif Ur Rehman	Biotechnology/Swabi	Assistant Professor
20	Dr. Shaukat Ali		
21	Dr. Huma Saleem	Botany/GCWU	Assistant Professor
22	Dr. H. Masooma Naseer Cheema		
23	Dr. Shah Nawaz-Ur-Rehman	Virology Lab/UAF	
24	Dr. Muhammad Asif Saleem		
25	Dr. Amir Shakeel		
26	Dr. Shahid Nazir		
27	Dr. Aftab Ahmad		
28	Dr. Nadia Iqbal	PBG/MNS-UAM	Lecturer
29	Dr. Arshad Shakeel	Entomology/MNS-UAM	Subject Expert
30	Dr. Muhammad Ishtiaq	Entomology/MNS-UAM	Assistant Professor

31	Dr. Unser Naeem ullah	Entomology/MNS-UAM	Associate Professor
32	Dr. Mirza Abdul Qayyum	Entomology/MNS-UAM	Assistant Professor
33	Dr. Habib ur Rehman	Agronomy/MNS-UAM	Lecturer
34	Dr. Nazim Hussain		
35	Dr. Abdul Sattar		
36	Dr. Muhammad Abu Bakar	PBG/MNS-UAM	Lecturer
37	Dr. Allah Baksh		
38	Mr. Umar Iqbal	PBG/MNS-UAM	Lecturer
39	Dr. Zulqurnain Haider Khan		
40	Mr. Syed Muhammad Zaka		
41	Mr. Muhammad Waqas Yonas		
42	Ms. Sabin Aslam		
43	Ms. Sibgha Noreen		
44	Mr. Muhammad Rafiq Shahid		
45	Dr. M. Ishtiaq	ENT/MNSUAM	Assistant Professor
46	Dr. Nadeem Ahmed	PP/MNSUAM	Assistant Professor
47	M. Zahid Sattar	FS&T/MNSUAM	Student
48	Hamza Afzal	ENT/MNSUAM	Student
49	Nimra Khursheed	BBAA/MNSUAM	Student
50	Huma Tariq	BBAA/MNSUAM	Student
51	M. Salman	HORT/MNSUAM	Student
52	Dr. Mirza Abdul Qayyum	ENT/MNSUAM	Assistant Professor
53	A.Mannan Khan	PBG/MNSUAM	Project Officer
54	Nabeel Ahmed Ikram	AGR/MNSUAM	Lecturer
55	Dr. Wazir Ahmed	SES/MNSUAM	Lecturer
56	Babar Farid	PBG/MNSUAM	Lecturer
57	Dr. Rao M. Ikram	AGR/MNSUAM	Assistant Professor
58	Dr. Hasan Riaz	PP/MNSUAM	Assistant Professor
59	Dr. M. Arshad Shakeel	ENT/MNSUAM	Subject Expert
60	Irfan Ahmed Baig	SS&H/MNSUAM	Dean FoSS&H
61	Dr. Abid Hussain	SES/MNSUAM	Assistant Professor
62	Dr. Abdul Ghaffar	AGR/MNSUAM	Associate Professor

63	Dr. Haroon Maqsood	PBG/MNSUAM	Assistant Professor
64	Dr. Tanveer ul Haq	SES/MNSUAM	Associate Professor
65	Dr. M. Arslan Khan	PP/MNSUAM	Assistant Professor
66	Dr. Nadia Iqbal	PBG/MNSUAM	Assistant Professor
67	Ummara Waheed	Biotech/MNSUAM	Assistant Professor
68	Saeed Rauf	PBG/MNSUAM	Associate Professor
69	M. Abubakar Siddique	PBG/MNSUAM	Lecturer
70	Dr. Khurram Mubeen	AGR/MNSUAM	Assistant Professor
71	Mudassir Aziz	AGR/MNSUAM	Lecturer
72	Dr. Shahid Iqbal	AGR/MNSUAM	Assistant Professor
73	Sabah Maryam	PBG/MNSUAM	Ph.D Scholar
74	Israr Hussain	CS/MNSUAM	Lecturer
75	Muiz-ud-din	CS/MNSUAM	Lecturer
76	Dr. Aamir Hussain	CS/MNSUAM	Assistant Professor
77	Adnan Altaf	CS/MNSUAM	Lecturer
78	Plosha Khanum	PBG/MNSUAM	Lecturer
79	M. Arslan Khalid	PBG/MNSUAM	Phd. Scholar
80	Munir Ahmed	ENT/MNSUAM	Researcher
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