

A BRIEF REPORT ON DST- SPONSORED SEVEN DAYS HANDS ON TRAINING PROGRAMME ON “SYNERGISTIC TRAINING PROGRAM UTILIZING THE ADVANCED RESEARCH INSTRUMENTATION” HELD FROM 21ST TO 27TH JANUARY, 2023 at the Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut (UP)

The Department of Science & Technology under the aegis of Synergistic Training Programme Utilizing the Scientific & Technological Infrastructure (DST-STUTI), sponsored one week Hands on training programme on **Synergistic Training Program Utilizing The Advanced Research Instrumentation**, which was organized from 21st to 27th January-2023, by the Department of Genetics and Plant Breeding (DST-FIST Sponsored) in collaboration with Jamia Hamdard University, New Delhi as a project management unit (PMU). The DST-STUTI Scheme is intended to provide training to human resource and its capacity building through open access to science and technology infrastructure across the country in departments funded under various DST schemes like DST-FIST, PURSE, SATHI. This event is aimed at providing hands-on training and sensitization of the state-of-the-art equipment and ensuring transparent access of science and technology facilities. Moreover, it will enable the budding researchers and professionals to develop better understanding and familiarization with the available resources/scientific equipment supported by the Govt. of India. The workshop was attended by all the graduate, post-graduate, research scholars and faculty members.

Honourable **Professor Sangeeta Shukla**, Vice-Chancellor, Chaudhary Charan Singh University Meerut was the Patron, **Dr. Shailendra S. Gaurav**, Dean, Faculty of Agriculture and Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut was the Organizing Chairman of this workshop. The Organizing Convener was **Dr. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut. **Dr. Rahul Kumar**, Professor, **Dr. Dharmendra Pratap**, Assistant Professor, **Dr. Sachin Kumar**, Assistant Professor, **Dr. Vinay Panwar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and **Dr. Ajay Kumar**, Assistant Professor, Department of Plant Protection, Chaudhary Charan Singh University, Meerut were the organizing Secretaries. The PMU Coordinator was **Dr. Suhel Parvez**, Professor and Head, Department of Toxicology, School of Chemical and Life Sciences, Jamia Hamdard University, New Delhi. The workshop Advisors were **Professor P.K. Sharma**, Vice-Chancellor, Maharaj Suhel Dev State University Azamgarh, Uttar Pradesh, **Professor P. K. Gupta**, Honorary Emeritus Professor, **Professor H. S. Balyan**, Honorary Emeritus Professor, **Professor S.P. Singh**, Honorary Emeritus Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

The primary objective of workshop was to impart both theoretical and practical knowledge of molecular techniques and instruments used for addressing research problems as well as their applications in agriculture, molecular medicine and detection and characterization of infectious organisms. The different techniques of molecular biology, bioinformatics, nematology and nanotechnology including; Nucleic acid extraction and purification from

plants, cDNA preparation, quantification, Primer Designing, RT-PCR, and UV-Visible Spectrophotometry, FTIR, AAS, Templification, Isolation of Plasmid DNA, Transformation, Cloning of Amplified viral genes, *in silico* gene prediction in plants, multiplication of plant parasitic nematodes, synthesis and characterization of silver nanoparticles were also covered in this workshop. Moreover, the workshop aimed to enhance the knowledge on the most efficient use of materials, reagents and interpretation of the results.

In order to prepare the participants for the hands-on practical sessions, the resource persons delivered a series of introductory lectures on Advanced Techniques and Instrumentation used in Agriculture and allied fields. The topics covered in the lecture sessions were relevant to the needs of the participants and covered the fundamental principles and procedures required for molecular biology, bioinformatics, nematology and nanotechnology. Eight invited speakers who are eminent scientists from prominent institutions in the country and seven speakers from the Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut delivered talks covering myriad applications during these seven days.

The workshop started with the inaugural function at **Applied Science Auditorium** of Chaudhary Charan Singh University on 21st January, 2023. The inaugural function was attended by many distinguished dignitaries viz; **Professor K. P. Singh**, Vice-Chancellor, Jyotiba Phule Rohilkhand University Bareilly Uttar Pradesh as the chief guest; **Dr. Manoj Prasad**, Senior Scientist /J.C.Bose Fellow from National Institute of Plant Genome Research, New Delhi as guest of honour and Keynote speaker, **Dr. Jitender Giri**, Staff Scientist III, National Institute of Plant Genome Research, New Delhi, as invited Lecturer, **Prof. Mohd Akram** represented PMU, Jamia Hamdard University; The guests were welcome by presenting plant saplings by the Faculty members of the Department of Genetics and Plant Breeding, CCS University, Meerut. **Prof. S. S. Gaurav**, Organizing Chairman delivered welcome address and also welcome all the participants. The programme was further continued with the details of the training programme by **Prof. Shailendra Sharma**, Organizing Convener. He also motivated all the participants and instruct them to participate in hands on training actively. This is followed by the Inaugural Lecture from **Dr. Manoj Prasad**, guest of Honour and keynote speaker through which he informed about the Advances in Genomics Research and its Application in Crop Improvement.

After the lecture from keynote speaker Chief Guest **Professor K. P. Singh** delivered his speech and suggested that steps should be taken to improve the level of education and research in all the institutions. He also proposed for MOUs with CCSU, Meerut. This proposal was accepted by **Prof. Sangeeta Shukla** during her Presidential address. She appreciated the efforts of faculty of Department of Genetics and Plant Breeding for organizing such advance hands-on training. She also welcomed all the participants and ask for the true feedback of the training. The session was followed by release of souvenir and presenting mementos to all the dignitaries. **Dr. Rahul Kumar**, Organizing Secretary presented a vote of thanks and expressed his gratitude to the Patrons, Chief Guest, dignitaries, participants and members of Chaudhary Charan Singh University Fraternity for making the event successful.



Release of STUTI programme training manual

The second session of the day 1 was coordinated by **Professor H. S. Balyan**. The second session included the lecture from **Professor P. K. Gupta** followed by the Lecture from **Dr. Jitender Giri**.

The vast arrays of topics covered by the different invited speakers from the Day 1 to the Day 7 of the workshop include:


- **“Advances in Genomics Research and its Application in Crop Improvement”** by **Dr. Manoj Prasad**, Senior Scientist /J.C.Bose Fellow from National Institute of Plant Genome Research, New Delhi, **“Gene-editing: Basics, Applications and A Case Study”** by **Dr. Jitender Giri**, Staff Scientist III, National Institute of Plant Genome Research, New Delhi and **“Evolving DNA-Based Molecular Markers and Their Use in Genetic Studies and Plant Breeding”** by **Prof. P. K. Gupta**, Honorary Emeritus Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut on the day 1 of the workshop.
- **“Understanding the drug development Roadmap: Indian perspectives”** by **Dr. Raj Kumar**, Research Scientist INMAS, DRDO, New Delhi and **“Nanobiotechnology for crop improvement”** by **Prof. S. S. Gaurav**, Dean, Faculty of Agriculture and Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut on the day 2 of the workshop.
- **“Genome Wide Association Mapping: Concepts and Analysis”** by **Dr. Neeraj Budhlakoti**, Scientist ICAR-IASRI, Pusa Campus, New Delhi and **“In Silico Prediction of Genes in Plants”** by **Prof. Rahul Kumar**, Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut on the day 3 of the workshop.

- **“Pre-breeding for wheat biofortification using classical and molecular cytogenetics approaches”** by **Dr. Sandip Kumar Malik**, Professor, GBPAU&T, Pantnagar, Uttarakhand, **“Combating whitefly infestation in plants via RNAi”** by **Dr. Jawaid Ahmad Khan**, Professor, Jamia Millia Islamia, New Delhi and **“Plant viruses: Current and Emerging threat to horticultural crops in India with reference to okra and banana”** by **Dr. Dharmendra Pratap**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut on the day 4 of the workshop.
- **“SNP discovery, crop breeding chips and genotyping platforms”** by **Dr. Sachin Kumar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and **“Genomic assisted technologies for crop yield resilience”** by **Dr. C. Bharadwaj**, Principal Scientist, ICAR-IARI, Pusa Campus, New Delhi on the day 5 of the workshop.
- **“Plant Parasitic Nematodes: The Hidden Enemy of Crop Plants”** by **Prof. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut on the day 6 of the workshop
- **“VIGS as a functional genomic research tool”** by **Dr. Vinay Panwar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and **“QTL mapping of high amylose starch in bread wheat”** by **Dr. Joy Kumar Roy**, Scientist, NABI, Mohali on the Day 7 of the workshop

The workshop was attended by 30 participants which included Assistant professors and research scholars from different institutions namely **Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir**; **Uttaranchal University**, Uttarakhand; **SVPUA&T**, Meerut Uttar Pradesh; **Eternal University**, Baru Sahib, Himachal Pradesh; **Banda University of Agriculture and Technology**, Banda, Uttar Pradesh, **Janta Vedic College**, Baraut, Baghpat, Uttar Pradesh; **Dr. Rajendra Prasad Central Agricultural University**, Bihar; **Swami Vivekanand Subharti University**, Meerut; **Sharda University**, Noida, Uttar Pradesh; **GBPUAT**, Pantnagar, Uttarakhand; **Meerut College**, Meerut, Uttar Pradesh; **Gurukul Kangdi University**, Haridwar, Uttarakhand.


The valedictory of the 7 days training program was conducted on 27th January, 2023 in the presence of distinguished Patron, **Professor Sangeeta Shukla**, Vice-Chancellor, Chaudhary Charan Singh University Meerut. **Dr. Sachin Kumar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut, Organising Secretary provided a brief report of the activities during the seven days of the training. He welcomed and thanked the invited guests for gracing the programme and concluded by wishing the participants good luck for their future endeavours. The participants were asked to provide feedback about the training program. The certificates of participation were distributed by **Professor Sangeeta Shukla**, Vice-Chancellor, Chaudhary Charan Singh University Meerut. The valedictory ended with the vote of thanks delivered by the organising secretary, **Dr. Dharmendra Pratap**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

At the end of the workshop, questionnaires were distributed to the participants to get their feedback of the training methodology, training materials and to get views on how to improve workshop in future. The feedback report from the participants was briefed by **Dr. Vinay Panwar, Assistant Professor**, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut. Overall, the participants were positive in their feedback and considered the workshop to have met its objectives. The participants considered the schedule of the workshop and technical arrangement of the practical sessions to be well organized. Their enthusiasm and interest were apparent from their 100% attendance on all days, presence throughout the long working hours, constant interactions and zeal to know more. Even the refreshment breaks and lunch provided on all days was enjoyed by them. In fact, they expressed the desire to attend more workshops on several topics to master the skills for becoming good researchers. They were also taken for a tour to the ancient city **Hastinapur**, a city located on the right bank of the Ganga River in the Meerut district in the Indian state of Uttar Pradesh, described in Hindu texts such as the Mahabharata and the Puranas as the capital of the Kuru Kingdom, is also mentioned in ancient Jain texts.



विज्ञान एवं प्रौद्योगिकी विभाग
**DEPARTMENT OF
SCIENCE & TECHNOLOGY**

काममेव जनेते





DST STUTI TRAINING PROGRAM

**“Synergistic Training Program Utilizing the
Advanced Research Instrumentation”**

21- 27 January 2023

In Collaboration with Jamia Hamdard PMU



ORGANIZED BY (VENUE):

**Department of Genetics and Plant Breeding
Ch. Charan Singh University,
Meerut- 2500 04 (UP) INDIA**

About the Department

The Department of Genetics & Plant Breeding (formerly, Department of Agricultural Botany) was established in 1969, initially as a part of Division of Plant Sciences under the Institute of Advanced Studies. The department has a unique position in the university and is recognized nationally and internationally for its academic and research activities. The department was also awarded UGC SAP-DRS and DST-FIST programmes. The department has received more than Rs. 100 millions as research/teaching grants from various national agencies. During last 25 years, the department has become known globally for its outstanding contributions in the area of development and use of molecular markers for quantitative trait loci (QTL) analyses and understanding the genetic control of important agronomic traits in wheat and other crop plants. Presently, the emphasis is on courses related to Genetics, Crop Biotechnology, Quantitative Genetics, Bioinformatics, Molecular Breeding, Cytogenetics, etc., which also represent the core and major thrust areas of research including epigenomics.

The more recent activities during the last 25 years involved development of molecular markers and their applications in the preparation of molecular maps, study of genetic diversity, genetic dissection of quantitative traits (grain yield, protein content, rust resistance, drought and heat tolerance, preharvest sprouting, Fe and Zn content in grains, etc.), plant parasitic nematode-wheat interaction, and marker-assisted selection involving introgression and pyramiding of genes/QTLs. As a result, the Department has identified and characterized a number of important QTLs/genes for the above traits for use in crop improvement programs, especially in wheat and developed several improved genetic stocks some of them being used by other institutions. The above studies were largely supported by the grants received from DBT, DST and ICAR.



Importance of the Training Program

Proposed workshop is highly useful for interdisciplinary research (like biotechnology, seed science, botany, plant pathology, horticulture etc.), teaching and training for all life science students and faculty member of this University and affiliated colleges. During this programme, lectures and hands on training on molecular techniques and equipment like AAS, FTIR, Real time PCR, PCR, Phase contrast microscope, Grain analyser, UV spectrophotometer etc. will be provided.

Major Theme

- ❖ Molecular Breeding for Crop Improvement.
- ❖ Advances in Crop Genomics.
- ❖ Application of Nanoparticles for crop improvement.
- ❖ Use of computational and bioinformatic approaches in Agricultural Sciences.
- ❖ Interval mapping and genome wide association studies (GWAS).
- ❖ Biofortification and Food Security.
- ❖ Molecular Virology

Registration Details

In total, 30 participants (with matching research areas) will be selected for the training. There are three categories of participants;

- Doctoral Students
- Post-doctoral Researcher
- Early-career Scientist/Faculty Members

- Candidate should send their CV and recommendation letter duly forwarded by their supervisor/Mentors/Head of the Department.
- There is no registration fee for training program and it is completely supported by the DST-STUTI Program.
- Limited accommodation will be provided to outstation candidates.

Link for Registration: <https://forms.gle/esLX19ZSxo9kPJEt6>

Last Date of Registration: December 31, 2022

Historical Places in and nearby Meerut



SARDHANA
CHURCH

AUGHARNATH
TEMPLE

JAMBUDWEEP
HASTINAPUR

CLOCK
TOWER

Organizing Committee

Patron

Prof. Sangeeta Shukla
(Hon'ble Vice Chancellor)

Organizing Convener

Prof. Shailendra Sharma
(HoD Dept. of Genetics & Plant Breeding)

Organizing Chairman

Prof. SS Gaurav
(Dean, Agriculture Faculty)

Organizing Secretaries

Prof. Rahul Kumar
Dr. Dharmendra Pratap

Dr. Sachin Kumar
Dr. Vinay Panwar

Advisors

Prof. P.K. Sharma, Prof. P.K. Gupta, Prof. H.S. Balyan, Prof. S.P. Singh, Prof. R.K. Varshney (Murdoch University, Australia), Dr. Manoj Prasad (NIPGR, New Delhi), Dr. Joy K. Roy (NABI, Mohali)

PMU Coordinator

Prof. Suhel Parvez,
Dept. of Toxicology, SCLS,
Jamia Hamdard

For any queries contact: gpbdstuti@gmail.com



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DEPARTMENT OF
SCIENCE & TECHNOLOGY



The Organizing Committee of the

"Synergistic Training Program Utilizing the Advanced Research Instrumentation"

Under DST STUTI Scheme

21 - 27 January 2023

In Collaboration with Jamia Hamdard PMU

Cordially invites you to the Inaugural Function

at

**Applied Science Auditorium
Chaudhary Charan Singh University, Meerut
On**

Saturday 21 January 2023 at 10.30 AM

Prof. Sangeeta Shukla

Hon'ble Vice-Chancellor, Chaudhary Charan Singh University, Meerut
Will preside over the function

Prof. KP Singh

Hon'ble Vice-Chancellor Mahatma Jyotiba Phule Rohilkhand University, Bareilly,
Will be the Chief Guest

Dr. Manoj Prasad

Staff Scientist VII; FNASc, FNAAS, FNA & J. C. Bose National Fellow
National Institute of Plant Genome research, New Delhi
Will be the Guest of Honor

ORGANIZED BY

Department of Genetics and Plant Breeding, Ch. Charan Singh University, Meerut- 2500 04 (UP)

Organizing Convener

Prof. Shailendra Sharma
(Head of the Department)

Organizing Chairman

Prof. SS Gaurav
(Dean, Agriculture Faculty)

Organizing Secretaries

Prof. Rahul Kumar
Dr. Dharmendra Pratap

Dr. Sachin Kumar
Dr. Vinay Panwar
Dr. Ajay Kumar

1

Different sessions from Day 1 to Day 7 of the workshop have been summed up in the following report:

Day 1,

INAUGURAL FUNCTION:

The workshop started with the inaugural function at Applied Science auditorium of Chaudhary Charan Singh University on 21st January, 2023. The inaugural function was attended by many distinguished dignitaries viz; **Professor K. P. Singh**, Vice-Chancellor,

Jyotiba Phule Rohilkhand University Bareilly Uttar Pradesh as the **chief guest; Dr. Manoj Prasad**, Senior Scientist /J.C.Bose Fellow from National Institute of Plant Genome Research, New Delhi as Guest of Honour and a keynote speaker. Inaugural function commenced with the welcome address by the Organizing Chairman **Dr. Shailendra S. Gaurav**, Dean, Faculty of Agriculture and Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut. The Organizing Convener, **Dr. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut emphasized on the importance of DST-STUTI as a Government of India sponsored flagship program in capacity building and dissemination of knowledge among the researchers residing in different regions within the country. He urged the delegates to forge networks and build long lasting collaborations by interacting with resource persons during the entire workshop. **Dr. Shailendra Sharma** also welcomed the esteemed guests and the participants in the lush green campus of Chaudhary Charan Singh University, Meerut and assured them of spending a productive week in the campus.

Jamia Hamdard University representative **Prof. Mohd Akram**, addressed the audience and explained the role of Jamia Hamdard as project management unit in attaining the objectives of DST-STUTI program. **Prof. Akram** discussed objectives of this program to train the researchers, post-doctoral fellows, young scientists and faculty members in using sophisticated instruments. He appreciated the efforts that Chaudhary Charan Singh University, Meerut has made in developing good infrastructure for promotion of research and expressed desire to continue the Hub and Spoke Partnership between Jamia Hamdard and Chaudhary Charan Singh University, Meerut for DST-STUTI Programmes in future too.

Dr. Manoj Prasad, Scientist VII & J. C. Bose National Fellow, National Institute of Plant Genome Research, New Delhi enlightened the audience with his motivating words and asked the participants and students in the audience to develop passion in their own fields of research. He acknowledged Chaudhary Charan Singh University, Meerut for their continued progress in the field of research. He emphasised on the fact that Universities like Chaudhary Charan Singh University, Meerut have become hubs of good research and should be encouraged to reverse brain drain.

The inaugural address proceeded with the captivating words of our esteemed Chief Guest, **Professor K. P. Singh, Vice-Chancellor, Jyotiba Phule Rohilkhand University Bareilly Uttar Pradesh. Professor K. P. Singh** emphasized on the need of transformation in science and technology over the entire globe which ultimately can lead to good innovations and fruitful research. He emphasised that proper implementation of science and technology policies will enhance the ease of doing research which will be important for making an impact in the field of science globally. He also pointed out the need to fix impediments to progress in research in the context of India like meagre budgetary allocation for research and less collaborative research. He impressed upon the participants to forge scientific collaborations and upgrade their skills consistently in order to get counted as Next Generation Leaders. He also proposed for MOUs with CCSU, Meerut. This proposal was accepted by **Prof. Sangeeta Shukla** during her Presidential address. She appreciated the efforts of faculty of Department of Genetics and Plant Breeding for organizing such advance hands-on training. She also welcomed all the participants and ask for the true feedback of the training.

The session was followed by release of souvenir and presenting mementos to all the dignitaries. **Dr. Rahul Kumar, Organizing Secretary** presented a vote of thanks and expressed his gratitude to the Patron, Chief Guest, dignitaries, participants, and members of Chaudhary Charan Singh University, Meerut fraternity for making the event successful.



Chief Guest, *Professor K. P. Singh*, Vice-Chancellor, Jyotiba Phule Rohilkhand University Bareilly Uttar Pradesh.



The Organizing Convener, **Dr. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut

एडवांस इंस्ट्रूमेंट की दी जानकारी

PIC : DAINIK JAGRAN INI

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MEERUT (22 Jan): सीसीएसयू के अनुवांशिकी व पादप प्रजनन विभाग में सात दिवसीय एडवांस इंस्ट्रूमेंटेशन ट्रेनिंग प्रोग्राम की शुरुआत हुई. मुख्य अतिथि महात्मा ज्योतिबा फुले रोहिलखंड यूनिवर्सिटी बरेली से वीसी प्रो. केपी सिंह रहे. विशिष्ट अतिथि नई दिल्ली के वैज्ञानिक डॉ. मनोज प्रसाद रहे. कार्यक्रम वीसी प्रो. संगीता शुक्ला की अध्यक्षता में किया गया. मौके पर प्रो. एसएस गौरव ने कार्यक्रम की सात दिनों की गतिविधियों के बारे में जानकारी दी. प्रोग्राम में जामिया हमदरद यूनिवर्सिटी के प्रतिनिधि के तौर पर प्रो. मो. अकरम व प्रो. पीके, डॉ. जितेंद्र गिरी ने विषय पर अपने विचार रखे. इस इंस्ट्रूमेंटेशन ट्रेनिंग प्रोग्राम में अलग-अलग राज्यों के 30 प्रतिभागियों ने भाग लिया.

7 दिन तक प्रोग्राम

पहले दिन प्रो. केपी सिंह ने सिंनजिस्टिक ट्रेनिंग प्रोग्राम एडवांस इंस्ट्रूमेंट विषय पर गहराई से प्रकाश डाला. इसके बाद शोधार्थी के लिए



ये रहे मौजूद

मौके पर प्रो. पीके गुप्ता, प्रो. एचएस बालियान, डॉ. धर्मद्र प्रताप, डॉ. सचिन कुमार, डॉ. विनय पंवार, प्रो. जितेंद्र ढाका, प्रो. अनिल मलिक, प्रो. विजय मलिक, डॉ. अशोक कुमार, डॉ. वाईके गौतम, प्रेस प्रवक्ता प्रशांत कुमार, इंजीनियर प्रवीन पंवार व मितेंद्र गुप्ता का योगदान रहा.

प्रयोगशाला के उपकरणों कि क्या महत्ता है उसके बारे में बताया. वीसी प्रो. संगीता शुक्ला ने भारत सरकार के विज्ञान व प्रौद्योगिकी मंत्रालय एवं जामिया हमदरद यूनिवर्सिटी को धन्यवाद ज्ञापित किया. वीसी ने ट्रेनिंग प्रोग्राम के सफल आयोजन के लिए प्रतिभागियों को रिसर्च के लिए इंस्ट्रूमेंट की उपयोगिता है इसके बारे में बताया. इसके साथ ही प्रतिभागियों

से प्रोग्राम के फीडबैक फार्म व सुझाव भी फार्म में भरवाए गए. यह प्रोग्राम अगले सात दिनों तक चलेगा, जि विभिन्न राज्यों के संस्थानों के वैज्ञानिक व प्रोफेसर व्याख्यान देने आएंगे. इस साथ ही विभाग अनुवांशिकी व पशु प्रजनन की अलग-अलग प्रयोगशाला में आधुनिक उपकरणों के संचालन रखरखाव व विज्ञान पर आधारित प्रयोगों की ट्रेनिंग भी दी जाएगी.

Inaugural session of the STUTI Programme



Jamia Hamdard University representative **Prof. Mohd Akram**



Felicitation of guests

Technical Session

The inaugural function was followed by the worthy presentations of two invited speakers viz **Dr. Manoj Prasad**, Senior Scientist at National Institute of Plant Genome Research, New Delhi and **Dr. Jitender Giri**, Staff Scientist III, National Institute of Plant Genome Research, New Delhi

The keynote speaker **Dr. Manoj Prasad**, presented a very informative lecture on “**Applications of Genomic research and its application in Crop Improvement.**” His talk emphasised on the development of novel set of markers and its application for genetic and comparative mapping, molecular genetic diversity studies, cloning of genes or quantitative trait loci (QTLs) leading to sequencing and annotation of large genomic DNA fragments for a variety of traits in crop species. Dr. Prasad suggested that plant molecular biology has the potential to initiate a new Green Revolution for sustainable agriculture to meet the needs of a fast-growing human population worldwide.

The second speaker Dr. Jitender Giri, presented a lecture on “**Gene-editing: Basics, Applications and A Case Study**”. He demonstrated the steps of CRISPR-Cas technology through animation and diagrams. He informed about the significance of the CRISPR-Cas technology in development of the genetically modified plants. He also discussed about the evolution and integration of this technology with the other methods like tissue culture for development of new plant varieties.

Prof. P. K. Gupta, delivered a detailed talk on “**Evolving DNA-Based Molecular Markers and Their Use in Genetic Studies and Plant Breeding**”. He represented his last ten years work on molecular markers. He explained development and utility of Molecular Markers viz. Restriction Fragment Length Polymorphisms, Sequence tagged Sites (STS) markers, SSR Markers (SSR Genetic Maps), Random Amplified Polymorphic DNA, EST-SSRs in Wheat and its Relatives, Single Nucleotide Polymorphism (SNPs), Diversity Array Technology (DArT) Markers MSAP for Methylated AFLP, etc. He also represented his work which he had done in collaboration like Ribosomal DNA Polymorphism and Climatic Variable in Collaboration with Eviator Nevo, Israel and Polymorphism at rDNA loci in barley and its

relation with climatic variables in Collaboration with I. Altosaar, University of Ottawa, Canada. **Prof. P. K. Gupta** concluded that DNA-Based Markers are stable and not influenced by environment; can be used as a supplementary tool for study of diversity, Genetic Studies & Plant Breeding; dozens of marker types are available now and are being used for study of diversity, Genetics and Plant Breeding for Crop Improvement.

After the invited lectures, the Laboratory and Field were visited by the participants lead by Faculty members, Department of Genetics and Plant Breeding, CCS University, Meerut. The participants were introduced to the instruments and the laboratory facilities available in laboratories (*Agrigenomics Lab, Bioinformatics Lab, Nanoscience and Nanobiology Lab, Molecular Biology Lab and Virology Lab*) in the department. In the field the participants were introduced to different crops (Heat Tolerant Wheat, Drought Tolerant Wheat, Maize, Okra, Mustard, etc.). They were explained about the experimental design and growth conditions necessary for the growth of crop plants by the Faculty members.



Day 1

Field Visit by Faculty members, Department of Genetics and Plant Breeding, CCS University, Meerut, the participants, and Volunteers

Day 2,

The invited speakers for the Day 2 were **Dr. Raj Kumar**, Research Scientist INMAS, DRDO, New Delhi and **Prof. S. S. Gaurav**, Dean, Faculty of Agriculture and Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

Dr. Raj Kumar discussed the “**Understanding the drug development Roadmap: Indian perspectives**”. He explained the steps for the development of drugs viz. choose a disease, choose a drug target, identify a bioassay, find a lead compound, synthesis of analogs of lead, identification of structure-activity relationship, identification of pharmacophore and structure optimization, patent the drug, continue to study drug metabolism, continue to test for toxicity, design a manufacturing process, carry out clinical trials, and market the drug. He also emphasized on the computer aided drug designing. He explained the harmful effects and positive effect of some drugs by taking the example of drug Thalidomide which was can cause deformities in the fetus and also used for treatment of leprosy.

Prof. S. S. Gaurav delivered a talk on “**Nanobiotechnology for crop improvement**”. He emphasized on the nanobiotechnology methods for Biogenic Synthesis and characterization

of silver and zinc nano-particles. He explained the Application and Comparison of Nano-biopesticides with commercial chemical pesticides against blight diseases of Potato and White grub and added that the stability and gradual release of the active ingredients for longer periods make them **eco-friendly in comparison with agrochemicals but the** evaluation of toxicity of nano-particles to plants and environment is necessary before their implementation in the field. He also informed that he has patented Liquid formulation of NP based insecticides with an aim to commercialize or transfer of the technology.

After the lectures, the participants were given hands on training on Synthesis, characterization and application of silver nano particles against plant diseases, led by Prof. S. S. Gaurav, Dr. Gyanika Shukla and Dr. Amardeep Singh.



Day 2

Lecture 1: "Understanding the drug development Roadmap: Indian perspectives" by **Dr. Raj Kumar**, Research Scientist INMAS, DRDO, New Delhi and **Lecture 2: "Nanobiotechnology for crop improvement"** by **Prof. S. S. Gaurav**, Dean, Faculty of Agriculture and Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut
Interaction with Participants



Day 2

Laboratory Session: Synthesis, characterization, and application of silver nanoparticles against plant diseases, led by Prof. S. S. Gaurav, Dr. Gyanika Shukla, and Dr. Amardeep Singh.

Day 3,

The invited speakers for the Day 3 were **Dr. Neeraj Budhlakoti**, Scientist ICAR-IASRI, Pusa Campus, New Delhi and **Prof. Rahul Kumar**, Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

Dr. Neeraj Budhlakoti discussed the role of “**Genome Wide Association Mapping: Concepts and Analysis**”. He emphasized on GWAS methods that involves rapidly scanning markers across the complete sets of DNAs, for identification of genetic associations to develop better strategies to detect, treat and prevent the disease. He guided the students to prepare and import the files for conducting GWAS. All the participants were also given hands on experience of GWAS by using software like TASSEL.

Prof. Rahul Kumar talk provided quick theoretical insight to “**In Silico Prediction of Genes in Plants**”. He discussed Application of Bioinformatics in the field of Genomics, Proteomics, 3D structure modelling of **Proteins**, Image analysis, Drug designing and a lot more. He illustrated about the various biological databases and their features like size of the databases, to identify the orthologs and paralogs using these databases. The participants were also introduced with the various alignment tools viz. BLAST and FASTA.

The lecture session was followed by hands-on-training in *In Silico Prediction of Genes in Plants: A case study* led by Prof. Rahul Kumar, Dr. Ritu Batra. Ms. Ruchi Balyan and Jyoti Chaudhary CCS University, Meerut. The gene prediction methods were demonstrated followed by using different bioinformatics tools by the participants for detection of the assigned gene.



Day 3

Lecture 1: “Genome-Wide Association Mapping: Concepts and Analysis” by Dr. Neeraj Budhlakoti, Scientist ICAR-IASRI, Pusa Campus, New Delhi and Lecture 2: “In Silico Prediction of Genes in Plants” by Prof. Rahul Kumar, Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut
Practical Session: *In Silico Prediction of Genes in Plants: A case study* led by Prof. Rahul Kumar, Dr. Ritu Batra. Ms. Ruchi Balyan and Jyoti Chaudhary CCS University, Meerut

Day 4,

The invited speakers for the Day 4 were **Dr. Sandip Kumar Malik**, Professor, GBPAU&T, Pantnagar, **Dr. Jawaid Ahmad Khan**, Professor, Jamia Millia Islamia, New Delhi and **Dr.**

Dharmendra Pratap, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut

Dr. Sandip Kumar Malik gave presentation on “**Pre-breeding for wheat biofortification using classical and molecular cytogenetics approaches**”. He explained the role of cytogenetics in determining the regions of the chromosomes where the gene that can be used for biofortification. He also explained the methods he himself developed in the lab for fluorescent in situ hybridisation.

The second lecture was delivered by **Dr. Jawaid Ahmad Khan** on “**Combating whitefly infestation in plants via RNAi**”. He started his lecture by providing information on the damage and economic loss caused by the whitefly in India as well as abroad. He was concerned towards increased use of insecticides and increasing resistance in the whiteflies towards widely used insecticides. According to him Bt cotton failed against sap sucking pests like whitefly. In his presentation, he discussed new techniques regarding **RNAi** and gave an insight into the pathway of **RNAi** for the control of whiteflies. This technology can be used for the control of begomoviruses.

The third lecture on day 4 was presented by **Dr. Dharmendra Pratap** on “**Plant viruses: Current and Emerging threat to horticultural crops in India with reference to okra and banana**”. **Molecular characterization of leaf curl virus associated with okra (*Ablemoschus esculentus*)**. He introduced students with the work going on in his laboratory. He explained the methods for the Development of diagnostics kit for the identification of viruses infecting banana for which he has PATENT granted. Other works he explained was study of genetic diversity and adaptability in chickpea (*Cicer arietinum*), development of silver and zinc oxide based nanofungicide through green route and evaluation of their effect against plant pathogens, development of unigene derived microsatellite markers for genetic diversity in okra (*A. esculentus* L.).

After this session, the hands-on-training was commenced by Dr. Dharmendra Pratap, Mr. Ankit Kumar, MR. Deepak Panwar CCS University, Meerut who introduced the participants to T/A and RCA cloning of begomovirus genes which they performed in the laboratory.



Day 4

Lecture 1: “Pre-breeding for wheat biofortification using classical and molecular cytogenetics approaches” by Dr. Sandip Kumar Malik, Professor, GBPAU&T, Pantnagar

Lecture 2: “Combating whitefly infestation in plants via RNAi” by Dr. Jawaid Ahmad Khan, Professor, Jamia Millia Islamia, New Delhi

Lecture 3: “Plant viruses: Current and Emerging threat to horticultural crops in India with reference to okra and banana” by Dr. Dharmendra Pratap, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut



Day 4

Practical Session: Dr. Dharmendra Pratap, Mr. Ankit Kumar, and Mr. Deepak Panwar CCS University, Meerut introduced the participants to T/A and RCA cloning of begomovirus genes

Day 5,

The speakers for the Day 5 were **Dr. Sachin Kumar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and **Dr. C. Bharadwaj**, Principal Scientist, ICAR-IARI, Pusa Campus, New Delhi.

Dr. Sachin Kumar delivered a detailed lecture “**SNP discovery, crop breeding chips and genotyping platforms**”. He stated the SNP and their role in the variation in the plants crops. He also explained about multi-nucleotide variants formed by grouping of SNPs. He demonstrated the resources and general approach for mining of the SNPs from different databases. He emphasized on the Illumina’s BeadArray Technology by showing the BeadChip to participants.

Dr. C. Bharadwaj, delivered a detailed lecture on “**Genomic assisted technologies for crop yield resilience**”. He introduced participants with Genomic Breeding Approaches viz. Marker Assisted Selection, Markerr Assisted Backcrossing, Marker Assisted recurrent Selection, Forward Breeding, Haplotype Based breeding and genomic selection. He also informed about the bacterial blight disease of rice and how the improved varieties are prepared which are resistant to bacterial blight.

The presentations were followed by two practical sessions in the molecular laboratory lab. The first session included DNA extraction, PCR setup, Gel electrophoresis and second session included RT-PCR, KASP assay genotyping by Dr. Sachin Kumar, Mr. Hemant, Mr. Anuj, Ms. Rakhi, CCS University, Meerut



Day 5

Lecture 1: “Genomic assisted technologies for crop yield resilience” by **Dr. C. Bharadwaj**, Principal Scientist, ICAR-IARI, Pusa Campus, New Delhi

Lecture 2: “SNP discovery, crop breeding chips, and genotyping platforms” by **Dr. Sachin Kumar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and



Day 5

Training Sessions: The first session included **DNA extraction, PCR setup, and Gel electrophoresis** and the second session included **RT-PCR, and KASP assay genotyping** by **Dr. Sachin Kumar, Mr. Hemant, Mr. Anuj, Ms. Rakhi**, CCS University, Meerut

Day 6,

The speaker for the Day 6 was **Prof. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

Prof. Shailendra Sharma delivered a lecture on title **“Plant Parasitic Nematodes: The Hidden Enemy of Crop Plants”**. He discussed the economic losses caused by the different plant parasitic nematodes with emphasis on two major nematodes *H. avenae* and *P.thornei*. He also explained the life cycle of these nematodes and the different strategies to control

these nematodes which are major concern in wheat and barley. To find out the genetic sources against these nematodes in wheat, QTLs, and GWAS approaches were also discussed in his lecture.

The presentation was followed by practical sessions in the Agrigenomics lab. The session included Carrot disc nematode culture and staining roots for plant-parasitic nematode visualization by Prof. Shailendra Sharma, Dr. Shiveta Sharma, Mr. Vikas Kumar Singh, Ms. Deepti Chaturvedi CCS University, Meerut

The post-lunch tour for Faculty members, Participants, Volunteers were scheduled to **Hastinapur**, a city located on the right bank of the Ganga River in the Meerut district in the Indian state of Uttar Pradesh, described in Hindu texts such as the Mahabharata and the Puranas as the capital of the Kuru Kingdom, is also mentioned in ancient Jain texts.



Day 6

Lecture: "Plant Parasitic Nematodes: The Hidden Enemy of Crop Plants" by Prof. Shailendra Sharma, Professor, and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut
Training Session: Carrot disc nematode culture and staining roots for plant-parasitic nematode visualization by Prof. Shailendra Sharma, Dr. Shiveta Sharma, Mr. Vikas Kumar Singh, Ms. Deepti Chaturvedi, CCS University, Meerut



Day 6

Tour to Hastinapur for Faculty members, Participants, and Volunteers

Day 7,

The speakers for the Day 5 were **Dr. Vinay Panwar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut and **Dr. Joy Kumar Roy**, Scientist, NABI, Mohali

The session started with the talk of **Dr. Joy Kumar Roy** on topic “**QTL mapping of high amylose starch in bread wheat**”. He gave a detailed account of the biofortification of crop plants for various mineral contents and how it is helping to overcome hidden hunger. He explained his work on the resistant starch in raw and processed food. He also demonstrated the method for determining the glycemic index using the mouse model. He concluded with the potential of biofortified crops in recent times and the future also.

Dr. Vinay Panwar delivered a talk on “**VIGS as a functional genomic research tool**” wherein he discussed the various principles and purpose of **VIGS**. He explained VIGS is a manifestation of RNA interference (RNAi), a universal phenomenon playing a pivotal role in defense and cellular regulation at multiple levels in a wide range of biological systems. He demonstrated the methods for Monitoring Gene Silencing Efficiency by VIGS



Lecture 1: “VIGS as a functional genomic research tool” by Dr. Vinay Panwar, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut
Lecture 2: “QTL mapping of high amylose starch in bread wheat” by Dr. Joy Kumar Roy, Scientist, NABI, Mohali

The workshop ended with the valedictory programme.

Valedictory Programme:

The valedictory of the 7 days training program was conducted on 27th January, 2023 in the presence of distinguished Patron, **Professor Sangeeta Shukla**, Vice-Chancellor, Chaudhary Charan Singh University Meerut.

Dr. Sachin Kumar, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut, Organising Secretary provided a brief report of the activities during the seven days of the training. He welcomed and thanked the invited guests for gracing the programme and concluded by wishing the participants good luck for

their future endeavours. The participants were asked to provide feedback about the training program.

The certificates of participation were distributed by **Professor Sangeeta Shukla**, Vice-Chancellor, Chaudhary Charan Singh University Meerut.

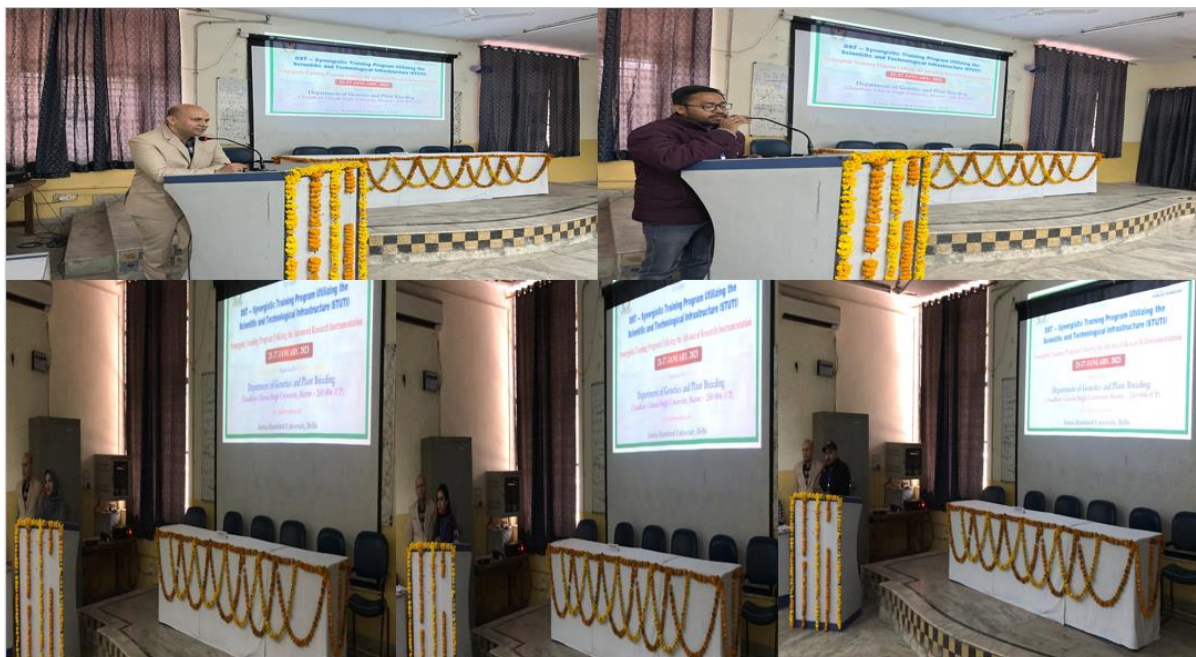
At the end of the workshop, questionnaires were distributed to the participants to get their feedback of the training methodology, training materials and to get views on how to improve workshop in future.

The feedback report from the participants was briefed by **Dr. Vinay Panwar**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut. Overall, the participants were positive in their feedback and considered the workshop to have met its objectives.

The participants considered the schedule of the workshop and technical arrangement of the practical sessions to be well organized. Their enthusiasm and interest were apparent from their 100% attendance on all days, presence throughout the long working hours, constant interactions and zeal to know more. Even the refreshment breaks and lunch provided on all days was enjoyed by them. In fact, they expressed the desire to attend more workshops on several topics to master the skills for becoming good researchers.

The final remark was given by Organizing Convener, **Dr. Shailendra Sharma**, Professor and Head, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.

The valedictory session ended with the vote of thanks delivered by the organising secretary, **Dr. Dharmendra Pratap**, Assistant Professor, Department of Genetics and Plant Breeding, Chaudhary Charan Singh University, Meerut.



Day 7

Feedback from Participants by Dr. Vinay Panwar CCS University, Meerut



Day 7

Certificate distribution by Hon'ble Vice Chancellor, CCS University, Meerut, and Faculty members



Group photograph of participants, resource personnel, faculty members, staff with Prof. Sangeeta Shukla, Hon'ble Vice Chancellor, CCSU, Meerut.