Dr. FATIMA BATOOL (PhD)

Presently working as Assistant Professor (BPS-19) in Plant Genomics Group and main focus of my research is the identification, isolation and characterization of genes related to biofuel production from Agave sisalana plants and abiotic stress tolerant genes in cotton (Gossypium arboreum) and other plant species by using the applications of plant genomics such as microarray, differential display and gene homology.

Academic Qualification

- **Ph.D. Molecular Biology "**Title of thesis was **"Genetic Transformation of Zinc Finger (*GaZnF*) Gene in Local Non-Bt Cotton and its Inheritance in T_1 Progeny"**. University of the Punjab, Lahore.
- **MPhil Molecular Biology,** University of the Punjab, Lahore.
- **MSC Masters in Zoology,** University of the Punjab, Lahore.
- **BSC (Botany, Zoology, Chemistry),** University of the Punjab, Lahore.

Awards

HEC Indigenous Scholarship for PhD from "Higher Education Commission of Pakistan (HEC)", Islamabad, Pakistan.

FOREIGN Fellowship

Six months "**International Research Support Initiative Program"** in University of the Manchester, **Manchester, UK**.

Grants/Fundings

PI of project, "Transformation of *Bt* cotton with transcription factor gene of G. arboreum to enhance drought tolerance" by University of the Punjab, Lahore 0.2 million PKRs 2023-cont.

ADMINISTRATIVE Experience

- Incharge, Journal Club CEMB (2009-2012)
- Assistant Superintendent in Girls Hostel No. 1, University of the Punjab, Lahore (2010-2013)

Student Supervision

05 MPhil students have completed degree while two MPhil and two PhD students are working under my supervision.

Academic Experience

Involved in teaching to MPhil and PhD students.

Research Experience

Seventeen years of extensive experience in the field of Biotechnology and Molecular biology. Strong understanding of Genetic Engineering and Molecular Analysis.

Objective

Want to work in a challenging environment, where task achievement and meeting the deadlines matters. To facilitate people by providing them services in an educational/Research environment. Want to work with energetic and sharp professionals in a true professional environment.

Publications

- Batool F, Hassan S, Azam, S. et al. (2023). Transformation and expressional studies of GaZnF gene to improve drought tolerance in Gossypium hirsutum. Sci Rep 13, 5064. https://doi.org/10.1038/s41598-023-32383-0
- Nawaz S, Maqsood S, Batool F, Sandhu, ZY, Hassan S, Akram F, Rashid B (2023). Improvement of abiotic stress tolerance in plants with the application of nanoparticles. In: Abiotic Stress in Plants - Adaptations to Climate Change; publisher Intech Open; Rijeka; editor Oliveira MTT and Fernandes-Silva AAA; chapter 1; doi = 10.5772/intechopen.110201; https://doi.org/10.5772/intechopen.110201. Published March 10, 2023
- Azhar, M., Batool, F., Akram F., Hassan, S., Rashid, B. (2022). Worldwide Impact of Covid-19 on Food Security and Farming Sector. Acta Scientific Biotechnology. 3(5), 01-08.
- Muzaffar, A., Arif, U., Akram, F., Batool, F., Hassan, S., & Rashid, B. (2022). Abiotic Stress: Interplay Between ROS Production and Antioxidant Machinery, Signaling, and ROS Homeostasis. OBM Genetics, 6(4), 1-20.
- Batool, F., Anicet Agossa, B., Y. Sandhu, Z., Bilal Sarwar, M., Hassan, S., & Rashid, B. (2022). Heat Shock Proteins (HSP70) Gene: Plant Transcriptomic Oven in the Hot Desert. Advances in Plant Defense Mechanisms. doi: 10.5772/intechopen.105391. Published June 26, 2022.
- Akhtar, F., Shah Khan, S., Badar, M., Niaz, Y., Akhtar, M. S., & Batool, F. (2022). (Review article*) Permaculture: Smart Growth Strategies and Management for Juniper Forest. European Online Journal of Natural and Social Sciences, 11(3), pp-597.
- Hassan, S., Ahmad, A., Batool, F. et al. (2021). Genetic modification of Gossypium arboreum universal stress protein (GUSP1) improves drought tolerance in transgenic cotton (Gossypium hirsutum). Physiol Mol Biol Plants 27, 1779–1794.
- Sher, Z., Majid, M. U., Hassan, S., Batool, F., Aftab, B., & Rashid, B. (2021). Identification, Isolation and Characterization of GaCyPI Gene in Gossypium arboreum under Cotton Leaf Curl Virus Disease Stress. Phyton, 90(6), 1613.
- Mushtaq, N., Badar, M., Akhtar, F., Batool, F., Sandhu, M. E., Khan, M. I., & Zia, M. A. (2021). Efficiency of Power Distribution Companies in Pakistan (Application of Non Parametric Approach).
- Fozia Iqbal, Sajjad Sadique, Fatima Batool, Muhammad Bilal Sarwar, Bushra Rashid, Muhammad Naveed Shahid, Ahmad Ali Shahid & Tayyab Husnain. 2017. Zinc finger transcription factor induces the drought, salt and cold stress tolerance in transgenic cotton. Indian Journal of Biotechnology. 16: 457-464.
- Riaz S, Aftab B, Sarwar MB, Batool F, Iqbal F, Ahmad Z, Rashid B, Husnain T. 2016. Adaptations of plant responses in *Agave sisalana* under drought stress conditions. Journal of Biodiversity and Environmental Sciences. 9(4): 114-123.
- Rao AQ, Khan MA, Shahid N, Din S, Gul A, Muzaffar A, Azam S, Samiullah TR, Batool F, Shahid AA, Nasir IA, Husnain T. 2015. An overview of phytochrome: An important light switch and photo-sensory antenna for regulation of vital functioning of plants. Biologia 70(10): 1273—1283.
- Samiullah TR, Ali A. , Azam S, Latif A, Batool F, Nasir IA, Husnain T. 2015. Analysis of Genetically modified BT and cp4EPSPS Cotton cultivars for transformation efficiency, acclimatization, expression and toxic levels to insects. Molecular Plant Breeding. 6(23): 1-6.
- Sarwar MB, Batool F, Rashid B, Aftab B, Hassan S, Tayyab Husnain. 2014. Integration and expression of heat shock protein gene in segregating population of transgenic cotton for drought tolerance,Pak. J. Agri. Sci. 51(4): 935-941.
- Rahman M, Rao AQ, Batool F, Azam S, Shahid AA. Husnain T. 2012. Transgene copy number and phenotypic variations in transgenic basmati rice. The Journal of Animal & Plant Sciences, 22(4): 1004-1013.
- Badar M, Khokhar I, Batool F, Ch Y. 2016. Managing the chlorine dose for disinfection of drinking water. Science International Lahore. 28(5): 4563-4568.
- Badar M, Khokhar I, Batool F. 2016. Shiga toxins removing from drinking water sources by treatment of coagulation process. Science International Lahore. 28(4):3947-3953.

- Badar M, Khokhar I, Batool F, Iqbal R, Ch.Y. 2017. Effect of boiling on removing of shiga toxins from drinking water samples. Journal of Entomology and zoology Sciences. 5(2): 672-676.
- Badar M, Khokhar I, Khan SS, Rahman M, Batool F, Ch. Y. 2015. Removal of cyanobacterial toxins from drinking water sources by aluminium sulphate treatment. Brazilian Journal of Biological Sciences. 2(3):119-129.
- Badar M, Batool F, Khan SS, Khokhar I, Qamar MK. Ch.Y. 2017. Effects of microcystins toxins contaminated drinking water on hepatic problems in animals (cows and buffalos) and toxins removal chemical method. Buffalo Bulletin. 36 (1): 43-53.
- Shafique K, Badar M, Qamar M K, Batool F, Mahmood S. 2017. A Study on Optimum Design Periods of Wastewater Treatment System. Indian Journal of Natural Sciences. 7(41): 12199-12203.
- Badar M, Shafique K, Zia MA, Batool F, Mahmood S. 2017. Present and Future Prospective of Drinking Water Management. Indian Journal of Natural Sciences. 7(41): 12214-12218.

Conference Proceedings

- Toheed S, Mazhar N, Majid U, Hassan S, Batool F, Akram F, Rashid B. (2023). GCK54; An Epicuticular Wax producing gene as a built-in weapon in Gossypium arboreum against Cotton Leaf Curl Disease Clcud. International conference on Mitigation and Adaptation technology for climate change organized by Foraman Christian College University, Lahore.
- Azhar M, Batool F, Hassan S, Rashid B. (2022). The consequences of Covid-19 on global food supply and agriculture sector" 3rd International Conference on Food, Nutrition, Environmental and Agricultural Sciences (ICFNEAS-22) held at Istanbul, Turkey on Feb 19-20, 2022.
- Batool F, Hussain H, Jabbar B, Azhar M, Hassan S, Rashid B, Shahid A A. (2021). In-Silico Analysis and Identification of Lignin Genes in Agave sisalana. 4th International Symposium on Advances in Molecular Biology of Plants and Health Sciences" organize by and held at CEMB Lahore 23-24 Dec. 2021, pp95.
- Hassan S, Zulfiqar F, Rashid B, Jamil A, Akram F, Batool F, Qamar Z, Sattar S, Shahid AA (2021). Tissue culture potential of Gossypium hirsutum (upland cotton) through somatic embryogenesis. Proc. Of the 4th International Symposium on Advances in Molecular Biology of Plants and Health Sciences" organize by and held at CEMB Lahore 23-24 Dec. 2021, pp107.
- Hassan S, Rashid B, Batool F, Sarwar MB, Noor A, Nawaz S, Shahid AA (2021). Isolation and characterization of Abscisic Acid (ABA) Responsive Transcripts from Agave sisalana under drought stress. Proc. Of the 4th International Symposium on Advances in Molecular Biology of Plants and Health Sciences" organize by and held at CEMB Lahore 23-24 Dec. 2021, pp107.
- Hassan S, Ismail P, Abbas Z, Sarwar MB, Batool F, Rashid B, Husnain T. (2019). Role of Leucine rich repeat (LRR) gene in transgenic cotton under drought stress. Proc Intl conf Recent innovations in molecular sciences held at University of the Punjab Lahore, Nov 06-08, 2019. Pp69.
- Hassan S, Rashid B, Batool F, Sarwar MB, Ahmad Z, Sher Z, Husnain T. (2017) Expression of universal stress protein gene (GUSP1) will endure the abiotic stress tolerance in transgenic cotton. Proc of the International Symposium on Environmental Stress Adaptation & Memory in Plants. RIKEN Center for Sustainable Resource Science, Yokohama City, Kanagawa, Japan. Feb 27-28 2017
- Hafeez MN, Hassan S, Sarwar B, Batool F, Ali Q, Rashid B, Husnain T, Khan MA (2017). Enhancing abiotic stress tolerance in local varieties of Cotton by manipulating the stress resistance genes. Poster presented at "2nd International Symposium on Advances in Molecular Biology of Plants and Health Sciences" organize by and held at CEMB Lahore 21-23 Nov. pp105
- Husnain T, Rashid B, Hassan S, Sarwar MB, Mohamed BB, Batool F, Riaz S, Hafeez MN, Ahmad Z. (2017). Identification of abiotic stress tolerant genes in plants. Proc. "Conference on computational biology and genomics" organized by and held at Centre for Human Genetics, Hazara University Mansehra 27-29 Sep. pp 14.
- Hassan S, Aslam A, Sarwar MB, Batool F, Ahmad Z, Hafeez MN, Sadique S, Parveen S, Majid MU, Rashid B, Husnain T. (2015) The role of Gossypium arboreum Universal Stress Protein (GUSP1) in Gossypium hirsutum.

Proc. Intl symp Advances of molecular biology in agriculture and health sciences", held at CEMB, Lahore, Dec. 29-31, 2015; PP:07.

- Husnain T, Jamal A, Shahid MN, Aftab B, Batool F, Rashid B. (2014). Gene Identification, function and Expression Analysis of Gossypium arboreum under Abiotic Stresses Using Modern Genomic Approaches. Poster presented at International Cotton Genome Initiative conference (ICGI) at Wuhan China, Sep. 25-28, 2014.

Poster Presentations

- Batool F, Hussain H, Akram F, Azhar M, Nadeem S, Jabbar B, Sher Z, Hassan S, Rashid B, Shahid A (2021). In Silico analysis and identification of lignin genes in Agave sisalana. Poster presented at 4 th International Symposium on on advances in Molecular Biology of Plants and Health Sciences held at CEMB, University of the Punjab, December 23-24.
- Sher Z, Majid MU, Rashid B, Hassan S, Batool F, Akram F, Ashraf R, Sattar S, Shahid AA (2021). GaCYP1 Induces Wax Abundance in Cotton to Tolerate Whitefly and Resistance against Cotton Leaf Curl Virus (CLCuV). Poster presented at 4 th International Symposium on on advances in Molecular Biology of Plants and Health Sciences held at CEMB, University of the Punjab, December 23-24.
- Husnain T, Jamal A, Shahid MN, Aftab B, Batool F, Rashid B. (2014). Gene Identification, function and Expression Analysis of Gossypium arboreum under Abiotic Stresses Using Modern Genomic Approaches. Poster presented at International Cotton Genome Initiative conference (ICGI) at Wuhan China, Sep. 25-28, 2014.

Professionals

- **Awareness Seminar on GM Soybean and potential of Soybean Cultivation in Pakistan**
  Center of Excellence in Molecular Biology, Lahore.
  23rd January, 2023.
- **International Conference on Trends and Challenges in Health Sciences**
  Center of Excellence in Molecular Biology, Lahore.
  1st to 2nd March, 2023.
- **4th International Symposium on Advances in Molecular Biology of Plants & Health Sciences**
  Center of Excellence in Molecular Biology, Lahore.
  23rd to 24th December, 2021.
- **International symposium on advances in molecular biology of plants and health sciences**
  Center of Excellence in Molecular Biology, Lahore. 28th to 31st December, 2015.
- **Microarray for gene expression**
  Center of Excellence in Molecular Biology, Lahore. 25th April, 2014
- **Application of biotechnology in health and agriculture**
  G. C University of Faisalabad, Faisalabad. 28th March, 2014.
- **Advances in applications of molecular biology**
  CEMB, University of the Punjab, Lahore. 23rd December, 2011.
- **Hands on training "Modern techniques in research on abiotic stress tolerance in plants**
  NIAB, Faisalabad. 05th to 9th September 2011.
- **In Service Faculty Training Program for the Module: Communication skills and competent English language usage essentials**
  Microbiology and Molecular Genetics, university of the Punjab, Lahore. 18th to 22nd October, 2011.
- **National Biotechnology Exhibition and seminar 2010**
  UVAS, Lahore. 20th to 21st October 2010.

ESTs Submitted

- Mohamed BB, Shahid MN, Dahab AA, Riaz S, Jamal A, Sarwar MB, Sadique S, **Batool F**, Hassan S, Sulaiman AA, Aftab B, Rashid B, HusnainT (2012). Identification of salt stress responsive gene(s) from Roselle (Hibiscus sabdariffa L.) by differential display. Acc# JK757799- JK757805; (7 ESTs).

Full Length Gene

- Sher Z, Majid MU, Hassan S, Batool F, Rashid B, Husnain T (2016). Gossypium arboreum wax related mRNA involve in protection against CLCuV infection caused by White fly showing homology with predicted peptidyl prolyl cis trans isomerase like (LOC108460743) mRNA. Accession # KY368095.
- Aftab B, Zahur M, Jamal A, Shahid N, Aftab M, Riaz S, Batool F, Rashid B, Husnain T (2012) CLCuV responsive gene from Gossypium hirsutum. GenBank accession # HQ338125.