

**Md. Mezanur Rahman**

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**Ph.D. student**

Institute of Genomics for Crop Abiotic Stress Tolerance

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### **SHORT BIO**

I am doing research for the last five years on deciphering the physiological, biochemical, and molecular mechanisms associated with phytohormones (e.g., **strigolactones**, salicylic acid)-, signaling molecules (e.g., **karrikin**, H<sub>2</sub>S, acetic acid)-, and nanoparticle (ZnO, CuO and Mn<sub>2</sub>O<sub>3</sub>)-induced abiotic stress (e.g., salinity, drought, heavy metals, submergence, and waterlogging) tolerance in higher plants, such as Maize, Wheat, Rice, Mung bean, Cotton and Soybean.

### **EDUCATION**

**Master of Science:** Agroforestry and Environment, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Bangladesh

**Passing year:** 2015

**CGPA:** 3.90 (on a scale of 4)

**Thesis Title:** Elucidation of salinity tolerance mechanisms of *Acacia auriculiformis*

**Bachelor of Science (Honors):** Agriculture, Patuakhali Science & Technology University (PSTU), Bangladesh

**Passing year:** 2012

**CGPA:** 3.86 (on a scale of 4)

**Merit Position:** eighth (out of 132 students)

### **RESEARCH PROFILE**

**Google Scholar:** <https://scholar.google.com/citations?hl=en&user=cK9VhfcAAAAJ>

**Research gate:** [https://www.researchgate.net/profile/Md\\_Rahman478](https://www.researchgate.net/profile/Md_Rahman478)

**ORCID:** <https://orcid.org/0000-0001-8822-9683>

### **RESEARCH INTEREST**

- Functions of signaling molecules (e.g., **NO**, **H<sub>2</sub>S**, **ethanol**, **acetic acid**), hormones (e.g., **strigolactones**, **salicylic acid**) and their crosstalk in plant responses to **abiotic stresses** (e.g., drought, high salinity, and heavy metal stresses).
- Discovery of **novel genes** for improvement of **abiotic stress tolerance** of crops (e.g., cotton, soybean, mung bean, maize, rice) using **genetic engineering**.

### **SELECTED PUBLICATIONS**

1. Das AK, Rahman MA, **Rahman MM**, Saha SR, Keya SS, Suvoni SS, Miah MG, Current D & Rizvi J (2021). Scaling up of jujube-based agroforestry practice and management innovations for improving efficiency and profitability of land uses in Bangladesh. **Agroforestry Systems** (Accepted). (IF: 2.549)
2. Saha G, Mostofa MG, **Rahman MM** & Tran LSP (2021). Silicon-mediated heat tolerance in higher plants: A mechanistic outlook. **Plant Physiology and Biochemistry** 166 (2021) 341–347 (IF: 4.270)
3. Younes NA, **Rahman MM**, Wardany AA, Dawood MF, Mostofa MG, Keya SS, Abdel Latef AA, Tran LSP (2021). Antioxidants and bioactive compounds in licorice root extract potentially contribute to improving growth, bulb quality and yield of onion (*Allium cepa*). **Molecules**. 2021 Jan; 26(9):2633. (IF: 4.411)
4. Mostofa MG, **Rahman MM**, Nguyen KH, Li W, Watanabe Y, Tran CD, Zhang M, Itouga M, Fujita M & Tran LSP (2021). Strigolactones regulate arsenate uptake, vacuolar-sequestration, and antioxidant defense responses to resist arsenic toxicity in rice roots. **Journal of Hazardous Materials**. <https://doi.org/10.1016/j.jhazmat.2021.125589> (IF: 10.588)

5. Mostofa MG, **Rahman MM**, Ansary MMU, Keya SS, Abdelrahman M, Miah MG & Tran LSP (2021). Silicon in mitigation of abiotic stress-induced oxidative damage in plants. **Critical Reviews in Biotechnology**. <https://doi.org/10.1080/07388551.2021.1892582> (IF: **8.429**)
6. Hosseini MS, Samsampour D, Zahedi SM, Zamanian K, **Rahman MM**, Mostofa MG & Tran LSP (2021). Melatonin alleviates drought stress impact on growth and essential oil yield of lemon verbena by enhancing antioxidant responses, mineral balance, and abscisic acid content. **Physiologia Plantarum**. <https://doi.org/10.1111/ppl.13335> (IF: **4.500**)
7. Siddiqui MN, Mostofa MG, **Rahman MM**, Tahjib-Ul-Arif M, Das AK, Mohi-Ud-Din M, Rohman MM, Hafiz HR, Ansary MM & Tran LSP (2021). Glutathione improves rice tolerance to submergence: insights into its physiological and biochemical mechanisms. **Journal of Biotechnology**. 325, 109-118. (IF: **3.307**)
8. **Rahman MM**, Mostofa MG, Keya SS, Rahman MA, Das AK, Islam MR, Abdelrahman M, Bhuiyan MSU, Naznin T, Ansary MMU & Tran LSP (2020). Acetic acid improves drought acclimation in soybean: an integrative response of photosynthesis, osmoregulation, mineral uptake, and antioxidant defense. **Physiologia Plantarum**. <https://doi.org/10.1111/ppl.13191> (IF: **4.500**)
9. Mostofa MG, **Rahman MM**, Siddiqui MN, Fujita M & Tran LSP (2020). Salicylic acid antagonizes selenium phytotoxicity in rice: selenium homeostasis, oxidative stress metabolism and methylglyoxal detoxification. **Journal of Hazardous Materials**. 394, 122572. (IF: **10.588**)
10. Mostofa MG, **Rahman MM**, Ansary MMU, Fujita M & Tran LSP (2019). Interactive effects of salicylic acid and nitric oxide in enhancing rice tolerance to cadmium stress. **International Journal of Molecular Sciences**. 20, 5798. (IF: **5.923**)
11. Latef AA, Mostofa MG, **Rahman MM**, Abdel-Farid IB, Tran LSP (2019). Extracts from yeast and carrot roots enhance maize performance under seawater-induced salt stress by altering physio-biochemical characteristics of stressed plants. **Journal of Plant Growth Regulation**. 38, 966-979. (IF: **4.169**)
12. **Rahman MM**, Mostofa MG, Rahman MA, Islam MR, Keya SS, Das AK, Miah MG, Kawser AQMR, Sowrav A & Tran LSP (2019). Acetic acid: a cost-effective agent for mitigation of seawater-induced salinity in mung bean. **Scientific Reports**. 9, 15186. (IF: **4.379**)
13. **Rahman MM**, Mostofa MG, Rahman MA, Miah MG, Saha SR, Karim MA, Keya SS, Akter M, Islam M & Tran LSP (2019). Insight into salt tolerance mechanisms of the halophyte *Achras sapota*: an important fruit tree for agriculture in coastal areas. **Protoplasma**. 256, 181-191. (IF: **3.356**)
14. Tahjib-Ul-Arif M, Siddiqui MN, Sohag AA, Sakil MA, **Rahman MM**, Polash MA, Mostofa MG, Tran LSP (2018). Salicylic acid-mediated enhancement of photosynthesis attributes and antioxidant capacity contributes to yield improvement of maize plants under salt stress. **Journal of Plant Growth Regulation**. 37,1318-30. (IF: **4.169**)
15. **Rahman MM**, Rahman MA, Miah MG, Saha SR, Karim MA & Mostofa MG (2017). Mechanistic insight into salt tolerance of *Acacia auriculiformis*: the importance of ion selectivity, osmoprotection, tissue tolerance, and Na<sup>+</sup> exclusion. **Frontiers in Plant Science**. 8, 155. (IF: **5.753**)
16. **Rahman MM**, Haque MA, Nihad SAI, Howlader MRA & Akand MMH (2016). Morpho-physiological response of *Acacia auriculiformis* as influenced by seawater-induced salinity stress. **Forest Systems**. 25, 6. (IF: **1.255**)

#### **ACADEMIC ACHIEVEMENT**

- **Texas Tech University** has awarded me the **Helen DeVitt Jones Graduate Fellowship** for research and academic purpose for **2021-2024**.
- The ministry of science and technology, Bangladesh has awarded me the **National Science and Technology (NST) fellowship for research purpose during 2013-2015**.
- Received **DEAN's merit scholarship** for the academic years 2008-2012 from PSTU for performing excellent results.

## WORK EXPERIENCE

- **Researcher (July 2015 to June 2021)**  
World Agroforestry Centre (WAC), Country Liaison Office, BSMRAU, Gazipur-1706
- **Major responsibilities**
  - Carrying out research projects on the roles of different exogenous chemicals (glutathione, ethanol, acetic acid, hydrogen sulfide, sodium nitroprusside, nanoparticle, etc.) in improving the tolerance of various crops to abiotic stresses, including salinity, drought, submergence, waterlogging and heavy metals.
  - Assisting and executing different project works involved with the World Agroforestry Centre.
- **Researcher (March 2019 to November 2019)**  
The joint project involves Sri Lanka, Pakistan, India, and **Bangladesh (BSMRAU)**, financed by Asia-Pacific Network for Global Change Research (**APN**).  
**Title:** Identification of the best agricultural management practices with better greenhouse gas benefits in salinity affected areas of South Asia
- **Researcher (January 2017 to June 2019)**  
Project funded by the Ministry of Science and Technology, Government of the Peoples' Republic of Bangladesh  
**Title:**
  1. Mechanistic insights into exogenous acetic acid-induced drought tolerance of Soybean
  2. Identify the critical endurance limit of *Gliricidia sepium* tree towards salinity, drought, and waterlogging stress.
  3. Salinity tolerance mechanism of mango and neem as influenced by exogenous seawater application.
- **Research assistant (January 2018 to November 2018)**  
The joint project involves Virginia Polytechnic Institute and State University, **BSMRAU**, Kansas State University, and East Carolina University, financed by the National Science Foundation (**NSF**).  
**Title:** Coastal Erosion Vulnerabilities, Monsoon Dynamics, and Human Adaptive Response
- **Researcher (February 2016 to October 2016)**  
The joint project involves Sri Lanka, Bhutan, and **Bangladesh (BSMRAU)**, financed by Asia-Pacific Network for Global Change Research (**APN**).  
**Title:** Building Climate Resilience in Farming Systems in Slopping Lands

## TRAINING/WORKSHOP/CONFERENCE

- **Md. Mezanur Rahman**, Ashim Kumar Das, Sanjida Sultana Keya, Md. Robyul Islam, Md. Abiar Rahman, Shah Mohammad Naimul Islam, Md. Motaher Hossain, Mohammad Golam Mostofa. Strigolactones Positively Regulate Defense Mechanisms to Enhance Resistance Against Sheath Blight of Rice (*Oryza sativa*). Poster presented at **South Asia Biosafety Conference (2019), Dhaka, Bangladesh** and **won first prize**.
- Participated in a training program on "**User-oriented statistical downscaling of climate information in agriculture and water resources**" from 20 to 27 August 2017, organized by APEC climate center, **Busan, South Korea**.

## TECHNICAL SKILLS

- Seed germination, testing the effectiveness of plant growth regulators, measurement of plant growth-related parameters and phenotyping of plants under normal and stress conditions.
- Quantification of photosynthetic pigments, water-soluble proteins, total free amino acids, soluble sugars and total carbohydrates, preparation of extract and quantification of the non-enzymatic and enzymatic antioxidants, measurement of oxidative stress markers (lipid peroxidation product, hydrogen peroxide), analysis of metal uptake and accumulation.

- Staining of reactive oxygen species, for instance, superoxide (O<sub>2</sub><sup>•-</sup>) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>).
- Isolation of DNA, RNA and Protein, Polymerase Chain Reaction (PCR), RT-PCR, Agarose Gel Electrophoresis, SDS-PAGE.
- Adept in using MetaboAnalyst5.0 (<https://www.metaboanalyst.ca/>), MeV (<http://mev.tm4.org/>), Minitab (version 17.0), Origin PRO (<https://originlab.com/Origin>), SPSS (version 23.0), Statistix 10, Edraw (<https://edrawsoft.com/>) and Adobe software packages.
- Adept in using LI-6800 portable photosynthesis system, spectrophotometer, atomic absorption spectrophotometer, laminar airflow, high-speed refrigerated centrifuge machine, compound microscope connected with computer and camera, and growth chamber.

## **REFERENCES**

### **Dr. Lam-Son Phan Tran (Ph.D. supervisor)**

Professor, Department of Plant and Soil Science,  
Institute of Genomics for Crop Abiotic Stress Tolerance, Texas Tech University,  
Email: son.tran@ttu.edu

### **Dr. Mohammad Golam Mostofa (Collaborator)**

Professor, Dept. of Biochemistry and Molecular Biology,  
Bangabandhu SMR Agricultural University, Gagipur-1706,  
E-mail: mostofa@bsmrau.edu.bd