

## Hirendra Nath Barman, PhD

Principal Scientific Officer, Plant Physiology Division, Bangladesh Rice Research Institute (BRRI), Gazipur-1701, [hnbarman@yahoo.com](mailto:hnbarman@yahoo.com)

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### Executive Summary

- Experienced to generate novel mutant lines through mutagenesis via modern technique CRISPR/Cas9 system.
- Skilled in phenotypic and genotypic screening for developing abiotic stress tolerant in rice.
- Hands-on experience to use different software and bioinformatics tools for genome editing techniques.
- Experienced on research program development and execution for improvement of rice.
- Experienced of mentoring research associate and scientists.

### Technical Skills

- Experienced in bioinformatics and analyses of next generation sequencing data related to genome editing research.
- Experienced in expression analysis through GUS assay, Subcellular localization, Real-Time PCR and Western blot.
- Experienced in gene cloning and plant transformation for mutant lines in rice.
- Good in data collection, management and analysis by CropStat/R-Studio.

### Research Experiences

**12 November 2007 - 21 November 2012** - Worked as a Scientific Officer, Plant Physiology Division, Bangladesh Rice Research institute (BRRI), Gazipur-1701.

**Research Focus**

- Research on different aspects of rice stress physiology and crop management.
- Identification of abiotic stress tolerant Bangladeshi rice germplasm through phenotypic and genotypic characterization.

**22 November 2012 - to date** - Working as a Senior Scientific Officer, Plant Physiology Division, Bangladesh Rice Research institute (BRRI), Gazipur-1701.

**Research Focus**

- Phenotypic and molecular characterization of rice genotype in relation to abiotic stress.
- Development of biotic and abiotic stress tolerance rice line through mutagenesis by CRISPR/Cas9 system.
- Breaking yield ceiling through improvement of rice by modern techniques.

## Education

- 2019**                    **Graduate School of Chinese Academy of Agricultural Sciences, China; Advisor: Dr. Hu Peisong.**  
Ph.D. in Crop Genetics and Breeding, Dept. of Grain Quality and Nutrition, China National Rice Research Institute, Fuyang, Zhejiang, China.
- Dissertation**      • Generation of New Thermo-sensitive Genic Male Sterile Rice Line by Knocking out *TMS5* Gene based on CRISPR/Cas9 System  
• The Function Analysis of a Putative Lipid Transfer Protein *OsLTPL164* in Grain Development and Quality in Rice
- 2010**                    **Bangladesh Agricultural University, Mymensingh; Advisor: Dr. Md. Obaidul Islam.**  
MS in Crop Botany, Dept. of Crop Botany, Bangladesh Agricultural University, Mymensingh.
- Dissertation**      Improvement of Mature Embryo-Based *In Vitro* Regeneration System in *Indica* Rice Cultivars for High Frequency Plantlets Production
- 2007**                    **Bangladesh Agricultural University, Mymensingh; Advisor: Dr. Md. Ferdous Mondal.**  
MS in Horticulture, Dept. of Horticulture, Bangladesh Agricultural University, Mymensingh.
- Dissertation**      Effects of Number of Suckers per Hill and Plant Nutrition on Growth, Yield and Quality of Banana
- 2005**                    **Bangladesh Agricultural University, Mymensingh**  
B.Sc.Ag.(Hon's), Faculty of Agriculture, Bangladesh Agricultural University, Mymensingh, Bangladesh.

## Attended in Training

### (a) In Country Training

| Sl. No. | Name of training                            | Organization  | Duration  |
|---------|---|---------------|---|
| 1       | Hybrid Rice development and seed production | BRRI, Gazipur | 6 <sup>th</sup> April 2008 - 10 <sup>th</sup> April 2008  |
| 2       | One-month rice production training course   | BRRI, Gazipur | 27 <sup>th</sup> July 2008 - 25 <sup>th</sup> August 2008 |
| 3       | Genetic Theory of Hybrid Rice Breeding      | BRRI, Gazipur | 25 <sup>th</sup> April 2011 - 8 <sup>th</sup> May 2011    |

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| 4  | Research Methodology   | GTI, BAU, Myensingh    | 8 <sup>th</sup> October 2011 - 20 <sup>th</sup> October 2011   |
| 5  | Breeder Seed Production and Preservation of Rice   | BRRI, Gazipur          | 3 <sup>rd</sup> March 2012 - 5 <sup>th</sup> March 2012        |
| 6  | Data Management and Report Writing   | IRRI office, Dhaka     | 8 <sup>th</sup> April 2012 - 12 <sup>th</sup> April 2012       |
| 7  | Use and Maintenance of Modern Lab Equipments for NARS Scientists   | BARI, Gazipur          | 16 <sup>th</sup> April 2012 - 18 <sup>th</sup> April 2012      |
| 8  | Capacity Development for Farm Management Strategies to Improve Crop-Water Productivity using AquCrop Model | BRRI, Gazipur          | 8 <sup>th</sup> October 2012 - 12 <sup>th</sup> October 2012   |
| 9  | Implication of Molecular Tools in Crop Improvement under Stress Environment                                | BRRI, Gazipur          | 27 <sup>th</sup> January 2013 - 31 <sup>st</sup> January 2013  |
| 10 | Decision Support System for Agrotechnology Transfer (DSSAT)  | BRRI, Gazipur          | 9 <sup>th</sup> February 2013 - 13 <sup>th</sup> February 2013 |
| 11 | Genetic Data Analysis Software   | BRRI, Gazipur          | 23 <sup>rd</sup> June 2013 - 28 <sup>th</sup> June 2013        |
| 12 | 24 <sup>th</sup> Foundation Training Course for NARS Scientists  | BARD, Comilla          | 10 <sup>th</sup> November 2013 - 9 <sup>th</sup> March 2014    |
| 13 | Modeling Crop Growth using Info-Crop and WOFOST  | BRAC-CDM, Savar, Dhaka | 19 <sup>th</sup> August 2014 - 23 <sup>rd</sup> August 2014    |
| 14 | Modeling Impact of Climate Change on Crop by using DSAAT Model   | BRAC-CDM, Savar, Dhaka | 26 <sup>th</sup> August 2014 - 28 <sup>th</sup> August 2014    |
| 15 | Hands-on Training on IDRISI and GIS  | BRAC-CDM, Savar, Dhaka | 30 <sup>th</sup> August 2014 - 2 <sup>nd</sup> September 2014  |
| 16 | Rice Physiological Development Through Trait Discovery Training Course                                     | BRRI, Gazipur          | 28 <sup>th</sup> December 2019 - 2 <sup>nd</sup> January 2020  |
| 17 | Scientific Report Writing Training Course  | BRRI, Gazipur          | 4 <sup>th</sup> October 2020 - 8 <sup>th</sup> October 2020    |

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| <b>18</b> | Innovation in Public Service   | BRRI, Gazipur | 12 <sup>th</sup> October 2020 -<br>13 <sup>th</sup> October 2020     |
| <b>19</b> | Application of Bioinformatics in Rice Improvement                                      | BRRI, Gazipur | 14 <sup>th</sup> October 2020 -<br>24 <sup>th</sup> October 2020     |
| <b>20</b> | Training on Advanced Research Data Management and Refresh of Scientific Report Writing | BRRI, Gazipur | 25 <sup>th</sup> September<br>2021 - 30 <sup>th</sup> September 2021 |

**(b) Foreign Training**

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|-----------|--|-------------------|---|
| <b>21</b> | Rice: Research to Production   | IRRI, Philippines | 20 <sup>th</sup> May 2013 -<br>7 <sup>th</sup> June 2013              |
| <b>22</b> | Training Program on Decision Support System for Rainfed Lowland Rice Production                            | IRRI, Indonesia   | 22 <sup>nd</sup> August 2013 -<br>23 <sup>rd</sup> August 2013        |
| <b>23</b> | Statistical Analysis of Relationship Between Rice Cultivar Characteristics and Climate Change Adaptability | JIRCAS, Japan     | (20 <sup>th</sup> November<br>2014 - 31 <sup>st</sup> January<br>2015 |

**Note**

BRRI: Bangladesh Rice Research institute, GTI: Graduate Training Institute, BARD: Bangladesh Academy for Rural Development, BRAC: Bangladesh Rural Advancement Committee, IRRI: International Rice Research institute, JIRCAS: Japan International Research Center for Agricultural Sciences.

**List of Publications**

1. Mondal, M. F and **H. N. Barman**. 2007. Effects of number of suckers per hill and plant nutrition on growth, yield and quality of banana. J. Bangladesh Soc. Agric. Sci. Technol., 4(1&2); 209-212.
2. Nahar, K., Biswas, J. K., Shamsuzzaman, A. M. M., Hasanuzzaman, M. and **H. N. Barman**. 2009. Screening of Indica Rice (*Oryza sativa* L.) Genotypes Against Low Temperature Stress. Bot. Res. Intl. 2 (4): 295-303.
3. Roy, K. R., **Barman, H. N.**, Biswas, P. L., Chowdhury, M. A. K. and N. M. Talukder. 2009. Response of Phosphorus and Sulphur on Nutrient Constituents of Aromatic Rice. Eco-friendly Agril. J. 2(9): 795-798.
4. M. S. Pervin, **H. N. Barman**, S. S. Parul and A. Islam. 2009. Effect of Depth and Duration of Submergence on Survival and Recovery of Rice (*Oryza sativa* L.) Seedlings. Bangladesh J. Prog. Sci. & Tech. 7(2):195-198.

5. M. A. A. Mahbub, J. K. Biswas, **H. N. Barman**, M. A. Haque and M. A. Ali. 2010. Performance of Breeding Lines Regarding the Seedling Quality, Elongation, Survival and Recovery Ability Under Submergence Condition. *Eco-friendly Agril. J.* 3(1): 16-21.
6. P. L. Biswas, **H. N. Barman**, S. Ghosal, S. Tohiduzzaman and M. Hazrat Ali. 2011. Stability Study for Growth Duration and Yield of Exotic Hybrid Rice Genotypes in Bangladesh. *Bangladesh J. Agril. Res.* 36(1): 97-102.
7. K. S. Akter, J. K. Biswas and **H. N. Barman**. 2012. Seed Priming and Seedling Establishment Under Anaerobic Conditions. *Bangladesh Rice J.* 16(1): 47-54.
8. M. S. Islam, J. K. Biswas and **H. N. Barman**. 2012. Seedling Establishment Ability of Some BRRI Varieties Under Anaerobic Conditions. *Bangladesh Rice J.* 16(1): 55-58.
9. J. K. Biswas, M. A. Hasan and **H. N. Barman**. 2012. Anaerobic and Submergence Tolerance of Swarna Sub 1 and Some other Rice Genotypes. *Bangladesh Rice J.* 16(1): 95-100.
10. **H. N. Barman**, Z. Sheng, S. Fiaz, M. Zhong, Y. Wu, Y. Cai, W. Wang, G. Jiao, S. Tang, X. Wei, P. Hu. 2020. Generation of a new thermo-sensitive genic male sterile rice line by targeted mutagenesis of *TMS5* gene through CRISPR/Cas9 system. *BMC plant biology.* 19(1):1-9
11. B. Nessa, M. U. Salam, A. H. M. M. Haque, J. K. Biswas, M. S. Kabir, W. J. MacLeod, M. D'Antuono, **H. N. Barman**, M. A. Latif, J. Galloway. 2015. Spatial pattern of natural spread of rice false smut (*Ustilaginoidea virens*) disease in fields. *American J. Agril. and Biol. Sci.* 10 (1):63-73
12. K. M. Iftekharuddaula, H. U. Ahmed, S. Ghosal, Al Amin, Zakiah R Moni, B. P. Ray, **H. N. Barman**, M. A. Siddique, B. C. Y. Collard, E. M. Septiningsih. 2016. Development of early maturing submergence-tolerant rice varieties for Bangladesh. *Field Crops Res.* 190:44-53
13. K. M. Iftekharuddaula, S. Ghosal, Z. J. Gonzaga, A. Amin, **H. N. Barman**, R. Yasmeen, M. Haque, J. Carandang, B. C. Y. Collard, E. M. Septiningsih. 2016. Allelic diversity of newly characterized submergence-tolerant rice (*Oryza sativa L.*) germplasm from Bangladesh. *Genetic Resources and Crop Evo.* 63 (5):859-867
14. S. Fiaz, S. Lv, **H. N. Barman**, T. Sahr, G. Jiao, X. Wei, Z. Sheng, S. Tang, P. Hu. 2019. Analysis of genomic regions governing cooking and eating quality traits using a recombinant inbred population in rice (*Oryza sativa L.*). *Int. J. Agri. and Biol.* 22:611-619

15. M. H. Rahman, Y. Zhang, K. Zhang, M. S. Rahman, **H. N. Barman**, A. Riaz, Y. Chen, W. Wu, X. Zhan, L. Cao, S. Cheng. 2017. Genetic dissection of the major quantitative trait locus (qSE11), and its validation as the major influence on the rate of stigma exertion in rice (*Oryza sativa* L.). *Frontiers in Plant Sci.* 8:1818
16. **H. N. Barman**, M. E. Hoque, R. K. Roy, P. L. Biswas, M. A. I. Khan, M. O. Islam. 2016. Mature embryo-based in vitro regeneration of indica rice cultivars for high frequency plantlets production. *Bangladesh Rice J.*20 (2):81-87
17. S. Fiaz, Z. Sheng, A. Zeb, **H. N. Barman**, T. Shar, U. Ali, S. Tang. 2021. Analysis of genomic regions for crude protein and fractions of protein using a recombinant inbred population in Rice (*Oryza sativa* L.). *J. Taibah Univ. Sci.* 15 (1):579-588

#### **Book chapter**

18. **H. N. Barman**. 2021. CRISPR-Cas9-Mediated Genome Editing in Rice: A Systematic Protocol for Single-and Multi-Target Vector Construction. *CRISPR-Cas Methods*, Humana, New York, NY. 179-205