

Department of Biochemistry and Molecular Biology Plant Biotechnology Laboratory

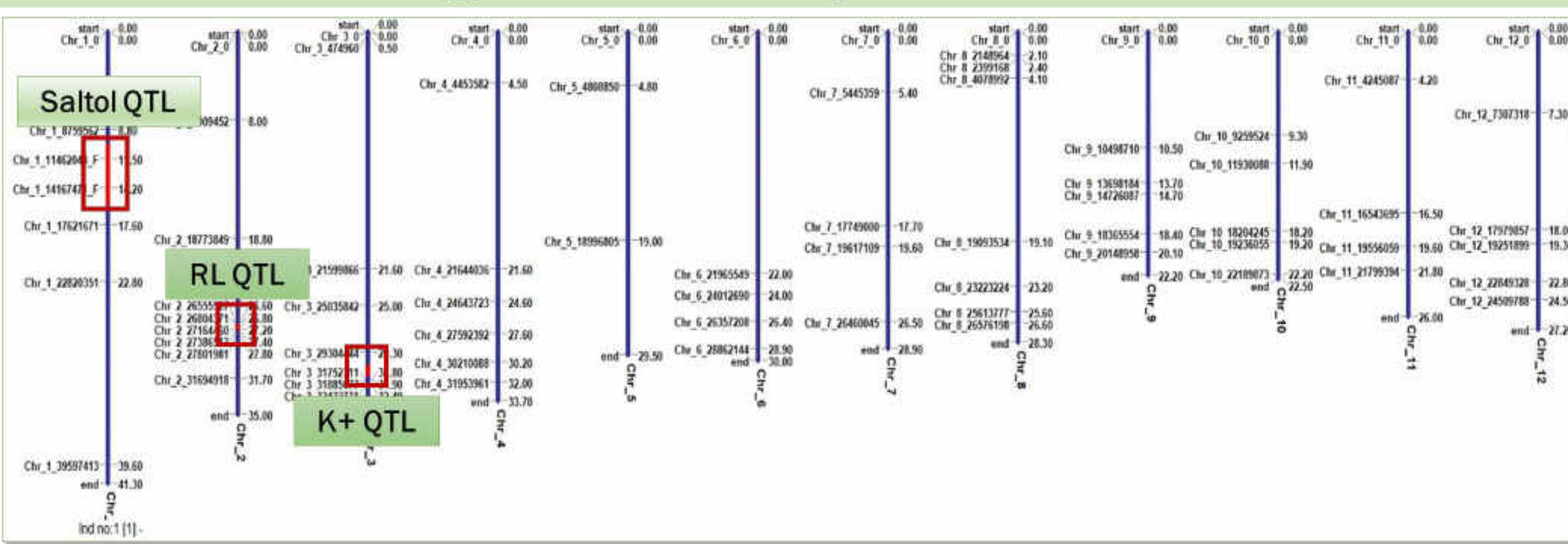
Principal Investigator: Prof. Dr. Zeba I. Seraj, Co-Investigators: Prof. Dr. Md. Rakibul Islam, Dr. Rifat Ara

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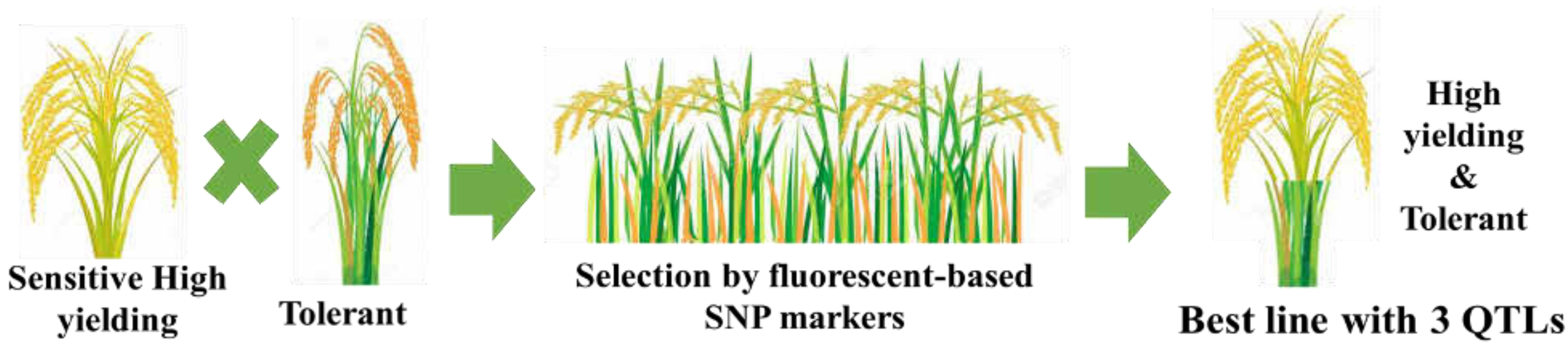
Development of salt-tolerant rice varieties (Target SDG 2, 12, 13) suitable for cultivation in the coastal areas of Bangladesh. Our laboratory contributed to

- DNA marker-based breeding (collaboration : IRRI and BRRI)
- Identification of the salt tolerance loci
- Characterization of QTLs/genes from salt-tolerant rice landraces
- Pioneered *in planta* transformation in rice
- CRISPR/Cas-based gene editing in rice

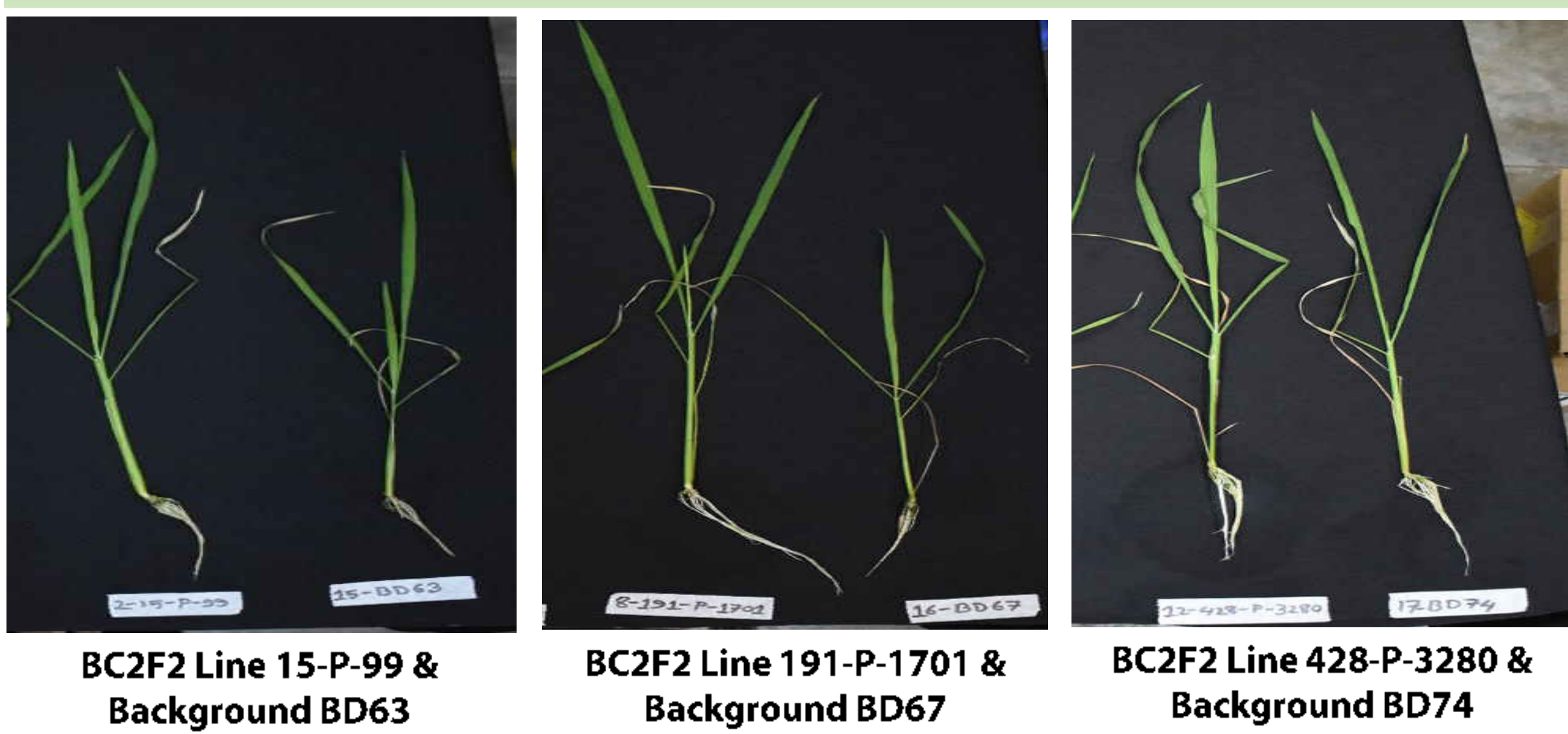
Ideal genotype having 3 Salt tolerant-QTLs in the genomic background of BD63, BD67 and BD74



Crossing to introduce 3 QTLs in BRRI dhan: Principle



Fluorescent DNA marker-assisted backcrossing with commercial BRRI Dhan



Publications of lab

frontiers in Plant Science
PLOS ONE
SCIENTIFIC REPORTS

HKT1;5 Transporter Gene Expression and Association of Amino Acid Substitutions With Salt Tolerance Across Rice Genotypes

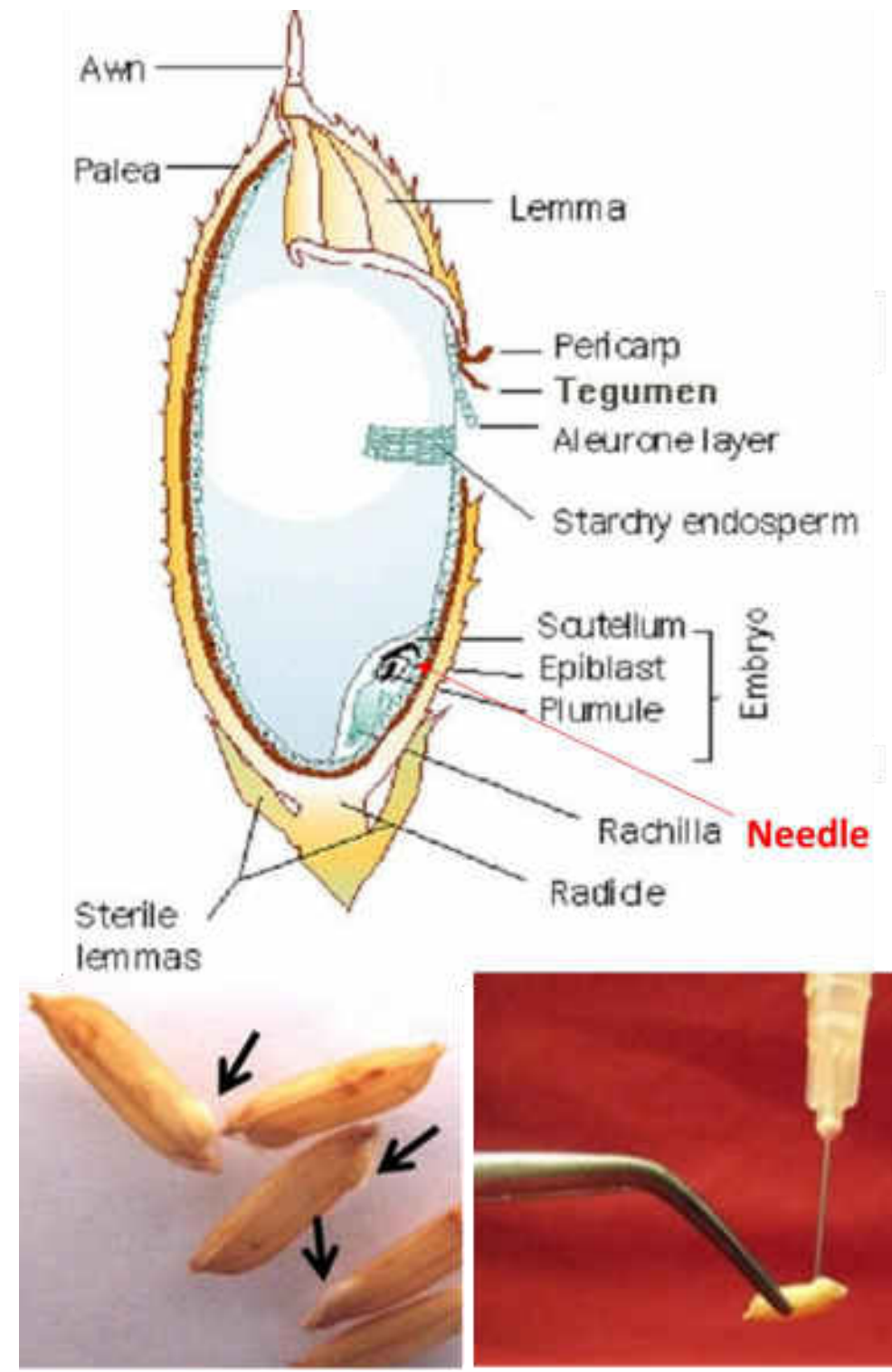
Novel QTLs for salinity tolerance revealed by genome-wide association studies of biomass, chlorophyll and tissue ion content in 176 rice landraces from Bangladesh

Reproductive stage physiological and transcriptional responses to salinity stress in reciprocal populations derived from tolerant (Horkuch) and susceptible (IR29) rice

Genetic variation in microsatellite DNA, physiology and morphology of coastal saline rice (*Oryza sativa* L.) landraces of Bangladesh

Enhanced Salt Tolerance Conferred by the Complete 2.3 kb cDNA of the Rice Vacuolar Na⁺/H⁺ Antiporter Gene Compared to 1.9 kb Coding Region with 5' UTR in Transgenic Lines of Rice

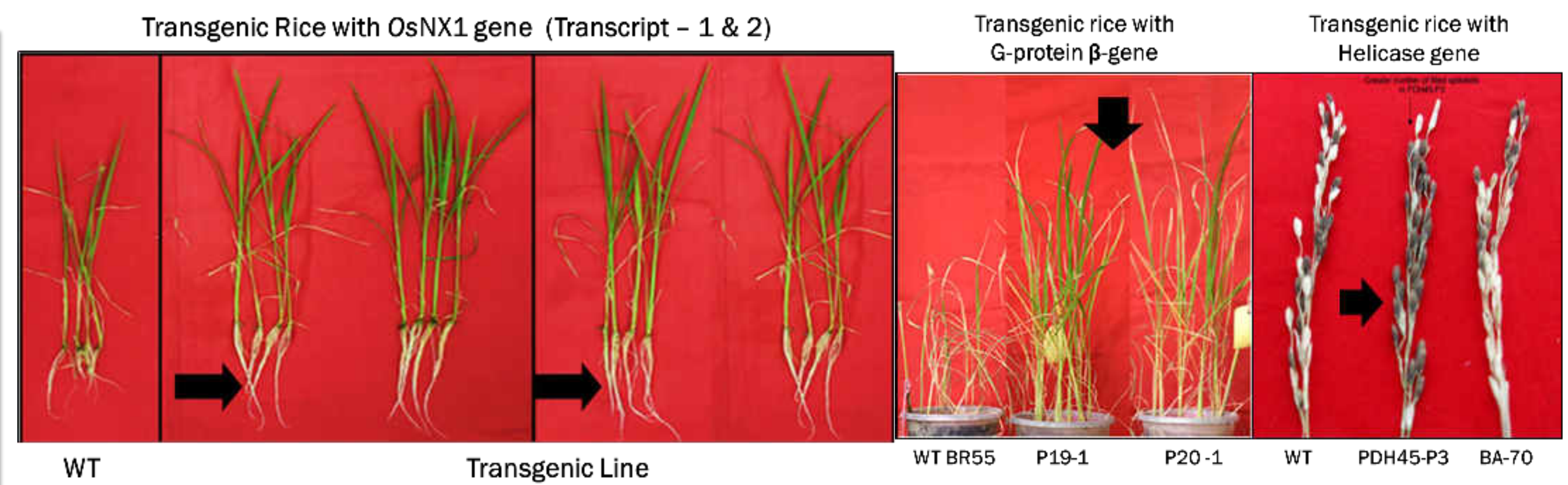
In planta transformation in rice



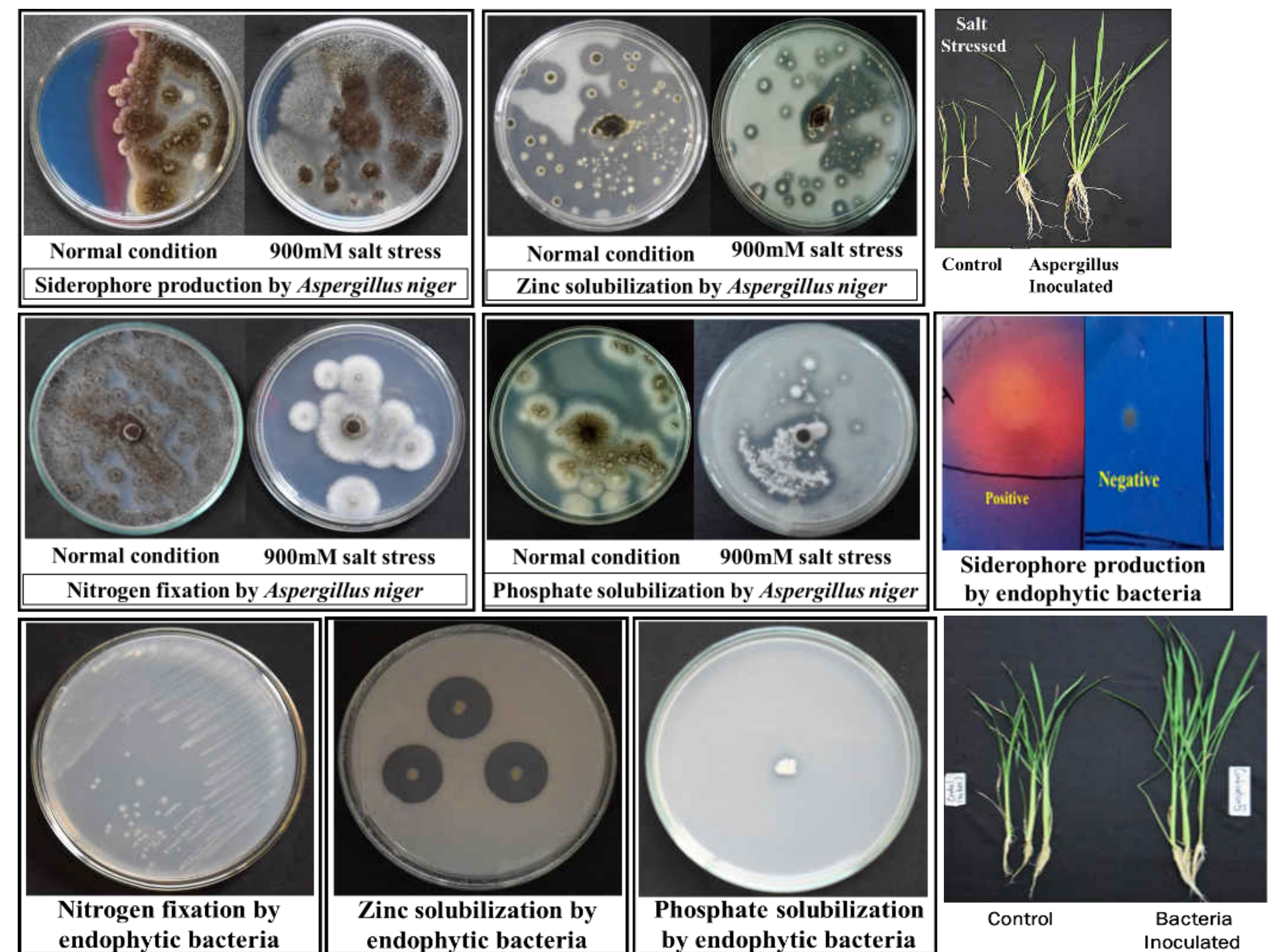
Transgenic Salt, drought, and heat-tolerant rice lines developed at Plant Biotechnology lab, BMB, DU.

Name	Genetic Background	Generation	No. of seeds	Properties	Publication
Rice vNa/H antiporter; 2.3 cDNA	BRRI Dhan 28	T ₅	300	Salt tolerant ~10dS/m	Amin et al. 2016 ¹ Biswas et al. 2015 ²
Pea DNA Helicase (PDH) cDNA	BRRI Dhan 47	T ₅	300	Salt tolerant ~10dS/m	Biswas et al. 2018 ⁴
At-HRD cDNA	BRRI Dhan 27	T ₅	300	Drought and Salt	Sumaiya Jannat, 2016. MS thesis, BMBDU ⁵
Rice SNAC1 cDNA	BRRI Dhan 55	T ₅	300	Drought and salt tolerant	Parvin et al. 2015 ⁶
Rice G-protein βsubunit cDNA	BRRI Dhan 55	T ₅	300	Drought and heat tolerant	Biswas et al. 2019 ⁸
amiRNA to DST transcription factor	BRRI Dhan 28	T ₅	300	Salt tolerant	Faisal et al. 2017 ⁹

Transgenic plants created via *in planta* transformation in rice



Identification & application of endophytes



Collaborations and Lab Members

