

Plant Pathology Division

Proposed Research Programme 2021-22

| Sl. No. | Programme area/Project (Duration) | Major Objectives(s) |
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| 1 | Survey and monitoring of rice diseases in selected areas | 1. To investigate the present status of different rice diseases in different climatic environments 2. To update disease crop calendar |
| 2 | Monitoring of rice diseases in HIZR and healthier rice under confined condition | To determine the incidence and severity of rice diseases on the genotypes. |
| 3 | Improvement of differential system for rice blast disease in Bangladesh using differential system and molecular marker | 1. To select new differential blast isolates 2. To identify candidate resistant gene(s) or source(s) 3. To monitor regularly of the evolution of new races |
| 4 | Studies on host ranges of blast pathogen | To determine the pathogenicity of all the isolates to rice and the pathogenicity of rice isolates to foxtail millet and barely |
| 5 | Pathotypic and genetic diversity of <i>Rhizoctonia solani</i> AG1-IA | 1. To estimate the genetic diversity of <i>R. solani</i> AG1-IA using ITS region sequences 2. To examine differentiation in aggressiveness of the isolates using seedling/plant assays in the greenhouse/field 3. To determine the relationship between geographic origin and the pathogenic as well as genetic variability of <i>R. solani</i> AG1-IA populations. |
| 6 | Identification of the source of infection of rice false smut disease | 1. To disclose whether the spores of <i>Ustilaginoidea virens</i> are in the air or not. 2. To identify whether seeds are the carrier of the pathogen or not |
| 7 | Isolation of potential fungi for controlling major weeds of rice | To identify potential microbes for controlling major weeds of rice |
| 8 | Identification of existing races of <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> and study on its diversity | To identify the existing races or pathotypes of <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> in Bangladesh |
| 9 | Linkage and QTL mapping of blast resistance in BR16 | To identify significant QTLs with linked marker for blast resistance in BR16 |
| 10 | Studies on the genetic mechanism of rice blast resistance in BRRI dhan33 | 1. To know the genetic mechanism of rice blast and gall midge resistance in BRRI dhan33 2. To identify marker data for developing blast and gall midge resistant varieties through MAS |
| 11 | Detection of novel loci underlying rice blast resistance by integrating a genome-wide association study | To detect the new sources/loci/genes of blast resistance from native germplasm |
| 12 | Diversity of blast resistance gene(s) in rice germplasm | To find out resistance gene(s) among the germplasm through phenotypic reaction and molecular marker |
| 13 | Observational trial of blast resistant advanced lines | To evaluate the blast resistance and yield |
| 14 | Development of Rice Blast Resistance by CRISPR/Cas9-Targeted Mutagenesis of the <i>OsERF922</i> | To develop durable blast resistant variety or line against the major races by targeted mutagenesis (CRISPR/Cas9) |
| 15 | Exploring new sources of resistance and pyramiding blast resistant gene into susceptible rice varieties | 1. To find out new source of major resistant gene(s) against blast disease in the native land races 2. To introgress of known resistant genes and/or gene pyramiding to develop durable blast resistant variety |

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| 16 | Development of blast resistant varieties using differential system and molecular markers | To develop blast resistant materials for Bangladesh |
| 17 | Introgression of multiple blast resistance genes in Boro varieties | To develop durable blast resistant pre-breeding materials |
| 18 | Introgression of blast resistance gene(s) into BRRI dhan58 using marker assisted backcross breeding | To introgress blast resistant genes (both Pi9 and Pb1) in high yielding BRRI dhan58 |
| 19 | Introgression of Blast Resistance Genes in BRRI dhan81 | To develop durable blast resistant pre-breeding materials |
| 20 | Molecular detection of BB resistant gene(s) in rice germplasm | To confirm resistant genes of bacterial blight resistance in the germplasm |
| 21 | Gene pyramiding of bacterial blight and blast resistance genes into the genetic background of BRRI dhan49, BRRI dhan63 and BRRI dhan81 | To introgress bacterial blight (BB) and blast resistant genes in the background of BRRI dhan49, BRRI dhan63 and BRRI dhan81 |
| 22 | Development of Multiple diseases resistant (blast and bacterial blight) pre-breeding materials through MAS | To develop blast and bacterial blight (BB) resistant Pre-breeding materials in the background of BRRI dhan28 |
| 23 | Observational trial of multiple disease resistance (blast and bacterial blight) | To evaluate the blast & bacterial blight resistance and yield performance |
| 24 | MLT of multiple disease resistance for advance lines in the background of BRRI dhan28, BRRI dhan29, BRRI dhan63 and BRRI dhan81 | To develop blast and bacterial blight (BB) resistant Pre-breeding materials in the background of BRRI dhan28, BRRI dhan29, BRRI dhan63 and BRRI dhan81 |
| 25 | Gene pyramiding of bacterial blight and blast resistant genes into the background of BRRI dhan29 | To introgress bacterial blight (BB) and blast resistant genes in high yielding variety BRRI dhan29 |
| 26 | Gene pyramiding for bacterial blight (BB) resistance | To develop gene pyramid lines for bacterial blight resistance |
| 27 | Validation of tungro resistant QTL identified in Landrace Kumragoir | To validate the tungro resistant QTL of Kumragoir landrace |
| 28 | Development of pre-breeding materials for tungro resistance | To develop tungro resistant advance lines. |
| 29 | Morphological and molecular characterization of upland rice germplasm against major rice diseases | 1. To know different diseases status of germplasm under natural infection. 2. To identify best genotype/s against disease and for better yield 3. To know diversity of upland germplasm using molecular markers |
| 30 | Simple application of bio-informatics in rice pathological studies | 1.To conduct etiological studies based on the sequence analyses of ITS region. 2.To detect the novel sources/loci/genes of blast and BB resistance from native germplasm. |
| 31 | Screening of advanced breeding lines and INGER | 1. To identify the source of resistance against blast disease of rice |

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| | against blast disease | |
| 32 | Screening for Bacterial Blight and Blast Resistance (TRB) | To screening advance genotypes or germplasm against BB and Blast diseases. |
| 33 | Screening of land races against Sheath blight disease | To identify the resistant source against sheath blight disease of rice |
| 34 | Screening of advanced breeding lines against sheath blight disease | To identify the source of resistance against sheath blight disease of rice |
| 35 | Development of Early Warning System of rice blast disease | To aware the rice growers at least 5 days earlier of blast disease infection. |
| 36 | Development of inoculation technique for false smut disease | To develop artificial inoculation technique of rice false smut disease |
| 37 | Validation of the presence of the pathogen of rice false smut disease in seeds through molecular identification and Grain Quality | To validate the previous findings |
| 38 | Development of a model for yield loss estimation due to sheath rot disease of rice | To develop a model applicable for yield loss estimation in farmers field due to sheath rot disease |
| 39 | Factors affecting recent outbreak of rice tungro disease | 1. To identify the causes of recent tungro outbreak in Cumilla region |
| 40 | Development of an effective inoculation technique for Sheath rot disease screening | To find out an effective and efficient inoculation technique for ShR disease development. |
| 41 | Bio-synthesis and characterization of silver nano-particles from available organic sources in Bangladesh. | 1. To bio-synthesize of nano-particles from available sources in Bangladesh. 2. To find out the effective nano-particles on fungal growth and to evaluate their efficacy on rice disease management. |
| 42 | Efficacy of nanoparticles against bacterial blight disease management in rice | 1. To determine efficacy of nanoparticles against bacterial blight disease |
| 43 | Efficacy of nanoparticles against blast disease management in rice. | To determine the anti-fungal effect of silver nanoparticles on hyphal growth of <i>M. grisea</i> . |
| 44 | Management of Sheath blight disease utilizing <i>Trichoderma harzianum</i> | To investigate the efficacy of <i>Trichoderma harzianum</i> formulated compost for sheath blight disease management. |
| 45 | Isolation of effective bacterial isolates for management of sheath blight disease | To isolate and identify the effective isolates against sheath blight disease |
| 46 | Evaluation of commercial biopesticides against sheath blight disease | To screen out the effective biopesticides for sheath blight disease |
| 47 | Chemical control of sheath rot disease of rice under different planting time | 1. To find out effective fungicide/s against Sheath rot. 2. To identify most conducive time for sheath rot disease development. |
| 48 | Formulation of nano particles and in vitro test of nano particles derived from plant products for controlling bakanae disease | 1. To formulate nano particles from organic sources for controlling bakanae disease. 2. To use nano particles from organic sources for safe environment |
| 49 | Identification of potential bio- | 1. To identify and confirm effective microbes through (Bacillus |

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| | control agents and formulation of biopesticides against bakanae disease of rice | spp, Pseudomonas spp., Trichoderma spp.) in vitro and molecular approach for controlling bakanae disease 2. To find out suitable carrier materials with prolong shelf life for biopesticide formulation |
| 50 | Efficacy of biocontrol agents to manage bakanae disease in field condition. | To evaluate field efficacy of formulated biopesticide against bakanae disease of rice in field condition |
| 51 | Chemical control of false smut disease of rice under different planting time | 1. To find out effective fungicide/s against false smut 2. To identify most conducive time for false smut disease development. |
| 52 | Determination of residual effect of trifloxystrobin, tebuconazole and tricyclazole in rice grain under field conditions. | To find out the pesticide residue in pesticides sprayed rice. |
| 53 | Digitalization of Pesticide Register Notebook | To provide the pesticide evaluation report in mobile phone. সেবা সহজিকরণ কার্যক্রম |
| 54 | Study on entomopathogenic fungi to control BPH | 1. To isolate the fungi from naturally infected insects 2. To know the pathogenicity of entomogenous fungi against BPH 3. Mass production of the entomogenous fungi and its use for BPH management |
| 55 | Evaluation of new chemicals against blast, bacterial blight, sheath blight, false smut, Sheath rot and bakanae diseases of rice | 1. To find out effective fungicide/s against false smut 2. To identify most conducive time for false smut disease development. |
| 56 | Training on integrated management of blast, bacterial blight and tungro diseases in changing climate | To build up farmer's awareness on integrated rice disease management |