National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Creating broad-spectrum disease resistance against rice blast by the introduction of a non-host resistance gene from Arabidopsis into rice.
Speaker	: Rishi Kesh(521ls6008)
Supervisor	: Santosh Kumar #2787
Venue	: LS Seminar Hall
Date and Time	: 18 Mar 2025 (15:00 hrs)
Abstract	: Rice is grown extensively in many parts of the world at different times of the year under different climatic conditions. Rice is the most essential cereal crop that forms a major part of the human diet and is hence popularly called "Global grain". With the increasing trend of the rising human population, it's high time to have crops with high yield potential and stability. Making the rice-based production system sustainable is crucial for the future food security of mankind. Rice blast is one of the fungal diseases that hamper the rice crop production by farmers, which could feed 6 million people a year. Rice blast is generally observed in the area where rice is cultivated. However, farmers' use of chemical pesticides to curtail the infection helps the pathogens to evolve into new races with enhanced resistance and that affects the environment greatly. Non-host resistance genes from the evolved plant in nature provide broad spectrum resistance as they can resist all forms of pathovars (Heath, 2000). Arabidopsis is immune to M. oryzae and is considered a nonhost plant possibly due to the presence of functional nonhost resistance genes in it (Park et al., 2009, Nakao et al., 2011). By following forward genetics, we identified that mutation as SNP (Ala to Val) in an NHR gene, MOSA in Arabidopsis leads to a breach in nonhost resistance against rice blast. Further, from a screening of 14 pss mutants of Arabidopsis, we identified that SNP mutation in specific genes also breached NHR against rice blast. We are aiming to create transgenic rice by introducing one of the screened genes from the mutant Arabidopsis via the Agrobacterium-mediated gene transfer method in the embryogenic elite cvr rice calli. Further, evaluating the promoter activity of the identified NHR gene upon infection in this transgenic line would delineate the plausible mode of genetic control in the activation of nonhost resistance against non-adapted pathogens that can be used in generating novel germplasm.