

Research Achievements

- Soybean (cv. DS-9712) was transformed using *Agrobacterium* harbouring the Cas9 vector containing sgRNA to study the gene function for mitigation of crop biotic stress. In PCR diagnosis using phosphinothricin acetyl transferase (PAT) gene specific primers, the transformants showed only discoloration of chlorophyll while the phosphinothricin (herbicide) treated plants turned with typical burning symptom in seventh day after sowing. In order to confirm Cas9 activity, IFS gene was amplified from the T1 plants and sequenced. Single base editing (T to C) was observed in IFS2.
- Tri-partite interaction (Chickpea-Fusarium-Endophyte) was studied to understand differential expression of genes in imparting endophyte mediated resistance against Fusarium. An increased expression of the genes namely NAC TF, Auxin binding protein ABP19a (AUX BP) (15 fold as compared to 2.5 fold), 14-3-3 like protein (14-3-3 P), Linoleate 9S-lipoxygenase (LOX) and Leucine- rich repeat protein (LRR) were found in the endophyte bio-primed and pathogen inoculated plants in early stage of pathogen infection as compared to the plants without endophyte bio-primed. Chickpea bacterial endophytes having antagonistic activity against Fusarium wilt can be used to understand the molecular mechanism of endophyte mediated resistance.
- Anatomical modifications in Si-induced rice yellow stem borer was studied using scanning electron microscope. Highest Si-deposition (24.32%) was noticed when the rice plant was Silicon-treated and YSB-infested. Microtomy studies revealed the aberration in the lining of midgut epithelium, damage in peritrophic membrane and disintegration of epithelial cells of the larva fed on silicon-treated plants. Volcano plots representing the distribution of genes revealed that the maximum number of genes were expressed during 3, 4 and 5 days after the larval release.

Technology

Technology certificate granted to **Dr. P. N. Sivalingam** for developing “Improved Agroinoculation method for Begomovirus infection in legumes”

Publications

- **Jain L, Kumar V, Jain SK, Kaushal P and Ghosh PK (2023)** Isolation of bacteriophages infecting *Xanthomonas oryzae* pv. *oryzae* and genomic characterization of novel phage vB_XooS_NR08 for biocontrol of bacterial leaf blight of rice. *Front. Microbiol.* 14:1084025. (NAAS IF- 12.06)

- **Pawar, P., R.K. Murali Baskaran, K.C. Sharma and A. Marathe. (2023).** Enhancing biocontrol potential of *Trichogramma chilonis* against borer pest of wheat and chickpea. *iScience* (NAAS IF- 12.11)
- **Saw, G., P. Nagdev, M. Jeer and R.K. Murli Baskaran (2023).** Silica Nano particles mediated insect pest management. *Pesticide Biochemistry and Physiology* (NAAS IF-10.97)
- **Dokka, N., A. Marathe, B. Sahu, P. Kaushal, P. K. Ghosh and P. N. Sivalingam. (2023).** *Cajanus scarabaeoides* yellow mosaic virus, a new bipartite begomovirus causing yellow mosaic disease in *Cajanus scarabaeoides* (L.) Thouars in India. *Plant Disease* (NAAS IF-10.61)

Awards and Recognition

- **Dr. P.N. Sivalingam** awarded Institution Recognition Award 2023 from ICAR-NIBSM during the Foundation day on 07th October 2023
- **Dr. P.N. Sivalingam** acted as Convener for technical session on Characterization, Diversity and Evolution of Viruses during the conference on VIROCON-2023 Advancements in Global Virus Research Towards One Health, during December 01-03, 2023 in Trichirappalli, Tamil Nadu
- **Dr. P.N. Sivalingam-** Rapporteur in International Conference on Natural Farming for Revitalizing Environment and Resilient Agriculture, 17-19 March 2023 at CAU, Imphal
- **Dr. P.N. Sivalingam-** As reviewer in Microbial Pathogenesis, Archives of Virology, Scientia Horticulturae, 3Biotech, Plant Biochemistry and Biotechnology, Virus Disease and Indian Phytopathology
- **Dr. Mallikarjuna, J-** Rapporteur in International Conference on Natural Farming for Revitalizing Environment and Resilient Agriculture, 17-19 March 2023 at CAU, Imphal
- **Dr. Vinay Kumar-**Associate Editor: Frontier in Microbiology(Microbe and Virus Interactions with Plants), Review Editor: Frontiers in Genetics (Evolutionary and Genomic Microbiology).
- **Dr. Vinay Kumar** Received Second prize in Hindi Sulekh (shrutlekh) during Hindi pakhwada(14 September 2023 to 28 September, 2023) organized at ICAR-NIBSM, Raipur.
- **Dr Ashish Marathe** received Best paper award 2023 from ICAR-NIBSM during the Foundation day on 07th October 2023

- **Dr P Kaushal** elected as NAAS Fellow
- **Dr. Vinay Kumar** acted as Convener in session –III in Panel discussion in Two Days State Level Workshop cum Training on “Sustainable Farm Income through Integrated Farming System by Adopting Biotic Stress Management” held at ICAR-NIBSM, Raipur on 21-22nd February, 2023.
- **Dr. Vinay Kumar** acted as Rapporteur in session –II Description of major government policies and schemes pertaining to agriculture in Two Days State Level Workshop cum Training on “Sustainable Farm Income through Integrated Farming System by Adopting Biotic Stress Management” held at ICAR-NIBSM, Raipur on 21-22nd February, 2023.
- **Dr Sandeep Adavi** received ASPB-ISPP Young Scientist Award -2023 at IARI New Delhi

Students Guided

- **Dr. P. N. Sivalingam- 3 (M. Sc)**
- **Dr. Vinay Kumar- 3 (M. Sc)**