

Dr. PALLAVOLU MAHESH REDDY

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Dr. Reddy has more than 25 years of research experience. Prior to joining TERI, Dr. Reddy worked at several leading research and academic institutions like International Rice Research Institute (Philippines), National Institute of Agricultural Sciences (Japan), National University of Mexico (Mexico), University of Florida, Virginia Commonwealth University, Auburn University and University of Tennessee (USA) and North-eastern Hill University and Goa University (India). Dr. Reddy's interdisciplinary approach to the study of developmental biology of cyanobacteria, and plant-microbial interactions, and his innovative and path breaking research in understanding genetic predisposition of rice for forming symbiosis with nitrogen-fixing rhizobia earned him international recognition. Dr. Reddy provided the evidence for the first time for the operation of photoinduction-photoreversal phenomenon in cyanobacteria similar to phytochrome-like system in higher plants, and gene expression studies in cowpea under continuous temperature stress led to the discovery of genes that potentially confer protection to plants under prolonged temperature stress. Dr. Reddy pioneered the investigations on determining genetic potential of rice for forming nitrogen-fixing symbiosis with rhizobia. Dr. Reddy, for the first time, demonstrated that rice has a mechanism to perceive and transduce rhizobial Nod signals leading to the activation of early nodulin genes akin to that occurring during legume nodulation. He further demonstrated that rice also harbors homologues of legume nodulation genes. These efforts provided definitive evidence for the existence of some of the developmental and signal transduction subprograms in the rice genome, which are similar to those that lead to the development of nitrogen-fixing symbioses in legumes. His innovative research has generated a remarkable interest among several research groups working on legume-rhizobial symbiosis in Europe, Japan and USA, and prompted them to initiate research on engineering rice for symbiotic nitrogen fixation. The pioneering research results of Dr. Reddy are being widely utilized by the scientific community in their investigations to enable rice to enter in to symbiosis with rhizobia. Dr. Reddy's work is cited extensively.

Current Research Activities

Bioengineering of rice plant for promoting rhizobial colonization and nitrogen-fixing symbiosis

Engineering of cyanobacterial carbon dioxide concentrating mechanism in rice for improved photosynthetic efficiency and grain yield

Assessing molecular strategies for expression of functional nitrogenase components in rice plants

Genetic enhancement of rice for improved phosphate utilization efficiency and definition of the rhizospheric microbiome

Development of transgenic rice lines resistant to sheath blight disease by modulating the expression of lignin biosynthetic pathway genes (with Dr. Swatishmita Dhar)

Control of spread of anthracnose disease-causing *Colletotrichum* fungi in chilli and tomato by RNAi approach (with Dr. Swatishmita Dhar)