PROJECT TITLE: Rapid development of NGS based SNP markers and marker assisted selection towards purple blotch resistance in Onion (*Allium cepa* L.)

INVESTIGATOR: Dr. Raj Kumar Joshi, Dept. of Biotechnology, Rama Devi Women's University, Bhubaneswar.

PROJECT SUMMARY:

Onion (Allium cepa L.) of the family Alliaceae is a high value spice cum bulbous vegetable crop with great commercial and medicinal significance. India is the second largest producer of onion with annual production of 6.5 million tonnes. However, onion productivity in recent times has been greatly affected by *Alternaria porri* infection that causes purple blotch disease and accounts for upto 40% yield losses. Management of purple blotch using fungicides and bio control agents is not 100% effective. Resistance development through host resistance breeding has not been successful in onion due to the availability of only a few naturally occurring resistant varieties. Hence, utilization of molecular markers in the identification and development of new onion cultivars resistant to purple blotch remains the most promising option. However, the non-availability of truly reliable molecular markers is a major constraint in the purple blotch resistance breeding. Therefore, the development of robust markers for fast and rapid detection of purple blotch resistance is the need of the hour for better efficiency and reproducibility. The availability of whole genome sequences (WGS) have shifted the perspective of DNA marker identification from fragment based polymorphism to sequence based single nucleotide polymorphism (SNP). The recent advent of next generation sequencing technologies and computational pipelines have further reduced the cost of WGS by manifolds allowing the discovery, sequencing and genotyping of thousands of SNP markers within a short time frame. SNPs linked to purple blotch resistance traits is yet to be characterized in onion. A comprehensive discovery of NGS based SNP makers and their subsequent linkage with the purple blotch disease resistance traits will play an important role in the early and rapid identification of resistant onion genotypes and their successful utilization in molecular breeding programmes to improve productivity.