

## INDO-UK REPORT

James Hutton Institute

Dear Alison,

My name is Swati Tyagi. I am from the Dr. K. Annapurna Lab from Indian Agricultural Research Institute. My lab is one of the participating labs in the India-UK Nitrogen Fixation Centre. The focus of our lab is to determine “Diversity of culturable root endophytic diazotrophs in two contrasting rice genotypes and their potential for plant growth promotion.”

I am highly obliged for being part of Dr. Euan James Lab from 26<sup>th</sup> April 2019 to 21<sup>st</sup> June 2019. It was an enriching experience to work in his reputed lab.

Two bacterial isolates (STJ5-W and STSE3-W), positive for *nifH* PCR and *ex-planta* nitrogenase activity, were selected for *in vivo* plant assay which was carried out at James Hutton Institute, with the following objectives-

1. Effect of endophytic diazotrophs on two contrasting rice genotypes.
2. Transmission Electron Microscopy to see the colonization pattern
3. Immunogold labeling for *nif-H* expression.
4. Confocal microscopy with gfp tagged DQS4 strain in both rice genotypes.

### **PGP effects of endophytic diazotrophs on rice genotypes-**

Significant increase in the plant growth was observed in the genotypes inoculated with diazotrophic STJ5-W and STSE3-W strains under nitrogen free conditions. Root biomass and shoot length increased in inoculated plants as compared to uninoculated controls.



- T1V1- STJ5-W with variety 1 , T1V2- STJ5-W with variety 2
- T2V1- STSE3-W with variety 1, T2V2- STSE3-W with variety 2
- T3V1- uninoculated control with variety 1, T3V2- uninoculated control with variety 2

### **Transmission Electron Microscopy**

Transmission Electron Microscopy on different time points with plant samples was carried out to observe the colonization of the two strains STJ5-W and STSE3-W. Immunogold labeling was done to observe the *nif-H* expression in the plant samples.

### **Confocal Microscopy**

A time course experiment was conducted to study the colonization pattern of the gfp tagged DQS4 strain obtained from JHI in the rice genotypes using confocal microscopy. It was observed that the two rice genotypes differed in their colonization pattern.

Dr. Euan was not only my constant source of motivation, but also meticulously attended to my needs during my stint as a visiting researcher in his laboratory. Dr. Euan lab helped me acquire a concrete understanding in microscopic techniques which paved way for my successful results in research. I am very thankful to Dr. Marta Maluk for her help with all the lab experiments in the entire period of two months.

Thank You,

Swati Tyagi