

INDUCED SYSTEMIC RESISTANCE (ISR) TECHNOLOGY: AN EFFICIENT BANANA BLOOD DISEASE MANAGEMENT STRATEGY

Ganisan Krishnen^{1,*}, Nur Sulastris Jaffar², Salehudin Md. Radzuan³, Sivanaswari Chalaparmal², Suhanna Ahmad², Suwardi Afandi Ahmad⁴, Nor Hanis Aifaa Yusoff², Nurul Faizah Mohd. Ridzuan¹, Md. Nurul Khalid Koyube², Siti Nur Raihan Azmi², Adnan Ambiah³, Muhammad Hanam Hamid¹, Badjie Xaebcourieyeian Ibadallah¹, Sufyan Afzan Sabarudin⁵, Mohd Kamal Tajuddin², Ramli Omar⁵, Noraimi Nordin⁵ and Muhammad Noor Azmie¹

¹Soil, Water and Fertilizer Research Centre; MARDI Headquarters, 43400 Serdang, Selangor, Malaysia

²Horticulture Research Centre, MARDI Headquarters, 43400 Serdang, Selangor, Malaysia

³Sintok MARDI Station, 06050 Bukit Kayu Hitam, Kedah, Malaysia

⁴Pejabat MARDI Negeri Sembilan, Pejabat Pos Seremban, 70400 Seremban, Negeri Sembilan.

⁵MARDI Jekebu, Simpang Durian, 72400 Jekebu, Negeri Sembilan

ganisan@mardi.gov.my

Malaysian banana industry was severely impacted by the arrival of blood disease, which was caused by the *Rolstonia syzygii* subsp. *celebesensis*. All the cultivated banana varieties in Malaysia were affected by this disease. Various approaches including chemical and biological controls were tested but none of them were successful in controlling this disease. One of the techniques that was not fully explored was the enhancement of plant resistance against diseases which is known as Induced Systemic Resistance (ISR). The aims of this study were to develop an induced systemic resistance (ISR) technique to control blood disease of banana. ISR technology was developed by bio-prospection and manipulation of ISR inducing PGPR. When the ISR banana seedlings were challenged with pathogen, three treatments had recorded 100% and another two 75% of disease suppression, where all the control (non-ISR) plants died. All these five treatments when further tested in the hotspot shown improved vegetative growth, yield and disease resistance. The best performing ISR treatment on the hotspot were selected for establishment of demonstration plot, which previously the bananas grown in the plot were severely infected by blood disease. After the first harvest of banana, there was no infection recorded which also recorded better vegetative growth, generated higher yield and better-quality banana. The post-harvest quality of the ISR banana produced in the demonstration plot were as good as banana produced in conventional method (non-ISR), indicating there is no any deleterious effect by inoculation of ISR inoculant.

Keywords: blood disease, banana bacterial wilt, *Rolstonia syzygii* subsp. *celebesensis*, Plant Growth Promoting Rhizobacteria (PGPR), ISR seedlings