

P162

An enhanced root system developmental responses under drought by inoculation of rhizobacteria (*Streptomyces mutabilis*) contributed to the improvement of dry matter production in rice

Roel R. Suralta*¹, Jayvee A. Cruz¹, Maria Corazon J. Cabral¹,
Jonathan M. Niones¹ and Akira Yamauchi²

¹ *Philippine Rice Research Institute, Maligaya, Science City of Munoz, Nueva Ecija, 3119 Philippines*

² *Graduate School of Bioagricultural Sciences, Nagoya University, Nagoya 464-8601, Japan*

Abstract

Drought limits rice production under upland condition. This study quantified the effect of rhizobacteria inoculation on rice root system developmental response to drought and its role in maintaining high soil water use, and dry matter production under drought using NSIC Rc192 (rainfed lowland rice variety). The source of inoculant was *Streptomyces mutabilis*, a recently isolated rhizobacteria containing plant growth promoting compounds such as ACC deaminase, indole-3-acetic acid and phosphatase (Cruz et al., 2014, 2015). In the first experiment, pre-germination inoculation of seeds with *S. mutabilis* significantly increased the shoot and root (radicle) length as well as root hair lengths, relative to the non-inoculated control. In the second experiment, rice plants inoculated with *S. mutabilis* and grown in rootbox with soil generally had greater total root length under drought regardless of the timing of inoculations, relative to the non-inoculated control. Consequently, improved root system development contributed to the increase in soil water uptake under drought and thus, dry matter production. Among inoculation treatments, one-time inoculation of *S. mutabilis* either at pre-germination or pre-drought stress at 14 days after sowing (DAS), had significantly greater shoot dry matter production than three-time inoculation at pre-germination, at thinning (3 DAS) and at pre-drought (14 DAS). This study demonstrated the effectiveness of rhizobacteria (*S. mutabilis*) containing growth promoting compounds for enhancing drought dehydration avoidance root traits and improving the growth of rice plants under drought condition.

Keywords: Dry matter production, rhizobacteria, root system development, upland rice, water use

Corresponding author*

Roel R. Suralta

Address: Philippine Rice Research Institute, Maligaya, Science City of Munoz, Nueva Ecija, Philippines

Tel and Fax: +63444560112

E-mail: rrsms@yahoo.com