

P175

Soil salinity shifts the community structure and diversity of seed bacterial endophytes of salt-sensitive and tolerant rice cultivars

Denver I. Walitang, Shamim Ahmed, Sunyoung Jeon, Chaeun Pyo and Tongmin Sa*

Department of Environmental and Biological Chemistry, Chungbuk National University, Cheongju, South Korea

Abstract

Soil salinity due to accumulation of salts particularly sodium chloride affects agricultural lands and their vegetation. Generally, rice is a moderately sensitive plant with some cultivars with varying tolerance to salinity. Though there are physiological differences between salt-sensitive and salt-tolerant rice cultivars, both are still affected especially during high salinity and prolonged exposure. This also ultimately affects their indigenous bacterial endophytes particularly those that inhabit the rice seed endosphere. This study investigates the dynamic structure of seed bacterial endophytes of salt-sensitive and tolerant rice cultivars grown in different levels of soil salinity. Endophytic bacterial diversity was studied Terminal-Restriction Fragment Length Polymorphism (T-RFLP) analysis. Results revealed a very interesting pattern of diversity and shifts in community structure of bacterial endophytes in the rice seeds. There is a general decrease in diversity for the salt-sensitive rice cultivar, IR29 as soil salinity increases. For the salt-tolerant cultivars, IC32 and IC37, diversity interestingly increased at moderate salinity then decreased at high soil salinity. The patterns of community structure is also strikingly different for the salt-sensitive and salt-tolerant rice cultivars. IR29 has a more even distribution of abundance, but under soil salinity, the community shifted where *Curtobacterium*, *Pantoea*, *Flavobacterium* and *Microbacterium* become the more dominant bacterial communities. For IC32 and IC37, the dominant bacterial groups under normal stress conditions were also the dominant bacterial groups during salt stress conditions. Their seed bacterial community is dominated by endophytes belonging to *Microbacterium*, *Flavobacterium*, *Pantoea*, *Kosakonia* and *Enterobacter*. *Stenotrophomonas* and *Xanthomonas* have not changed in terms of abundance under different salinity stress level in the salt-sensitive and salt-tolerant rice cultivars. This study showed that soil salinity greatly influenced the seed bacterial communities of rice seeds irrespective of their physiological tolerance to salinity.

Keywords: Soil salinity, Rice seeds, Endophytic bacteria, T-RFLP analysis, Salt tolerant and sensitive cultivars

Corresponding author*

Tongmin Sa

Address: Chungdae-ro 1, Seowon-Gu, Cheongju, Chungbuk 28644, South Korea

Tel: +82-43-261-2561, Fax: +82-43-271-5921

E-mail: tomsa@chungbuk.ac.kr