

Social behaviors shift properties that are beneficial to plants in two-member consortia of *Bacillus velezensis*

Jiahui Shao¹, Yan Liu², Hongyu Ding², Wenjuan Xu², Xinye Zhao², Jiyu Xie², Ben Fan³, Ruifu Zhang¹, Zhihui Xu², and Qirong Shen¹

¹Affiliation not available

²Nanjing Agricultural University

³Nanjing Forestry University

March 07, 2024

Abstract

Bacillus spp. strains that are beneficial to plants are widely used in commercial biofertilizers and biocontrol agents for sustainable agriculture. Generally, functional *Bacillus* strains are applied as single strain communities since the principles of synthetic microbial consortia constructed with *Bacillus* strains remain largely unclear. Here, we demonstrated that the kin discrimination system directly affects the survival and function of two-member consortia composed of *B. velezensis* SQR9 and FZB42 in the rhizosphere. A mutation in the global regulator Spo0A of SQR9 markedly reduced the boundary phenotype with wild-type FZB42, and the combined use of the *spo0A* mutant and FZB42 improved biofilm formation, root colonization and the production of secondary metabolites that are beneficial to plants. We further confirmed the correlation between the swarm discrimination phenotype within community members and effects that are beneficial to plants in greenhouse experiments. Our results provide evidence that social interactions among bacteria could be an influencing factor in achieving a desired community-level function.

Hosted file

Manuscript.doc available at <https://authorea.com/users/374970/articles/710906-social-behaviors-shift-properties-that-are-beneficial-to-plants-in-two-member-consortia-of-bacillus-velezensis>









