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GRADUATE STUDENT CLIMATE ADAPTATION PARTNERS (GRADCAP) WEBINAR SERIES

IMPROVING ABIOTIC STRESS TOLERANCE IN CROPS WITH RHIZOBACTERIA

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Plant Growth Promoting Rhizobacteria (PGPR) can improve plant tolerance to abiotic stresses associated with climate change, including heat, drought, and salinity stress.

Abiotic stresses, including heat, drought, and salinity stress are major factors limiting plant growth and productivity, with the severity of each of these stresses predicted to increase as a result of climate change. Plant Growth Promoting Rhizobacteria (PGPR) can form beneficial associations with the roots of plants to improve growth and increase tolerance to abiotic stress. To find bacteria that could survive in stressful environments, PGPR species were isolated from the roots of native grasses from the New Jersey Pine Barrens and were screened for their growth promoting properties. The bacteria strains that demonstrated the highest levels of activity were used to inoculate tomato, corn, perennial ryegrass, and creeping bentgrass plants that were subjected to abiotic stress conditions associated with climate change. Tomato, corn, and perennial ryegrass inoculated with PGPR demonstrated increases in shoot and root growth under salinity stress conditions. Inoculated creeping bentgrass plants exhibited increased chlorophyll content, photochemical efficiency, and root growth in heat and drought stress environments. PGPR can offer sustainable and effective solutions for improving plant growth in abiotic stress conditions, and for adapting cropping systems to the changing climate.

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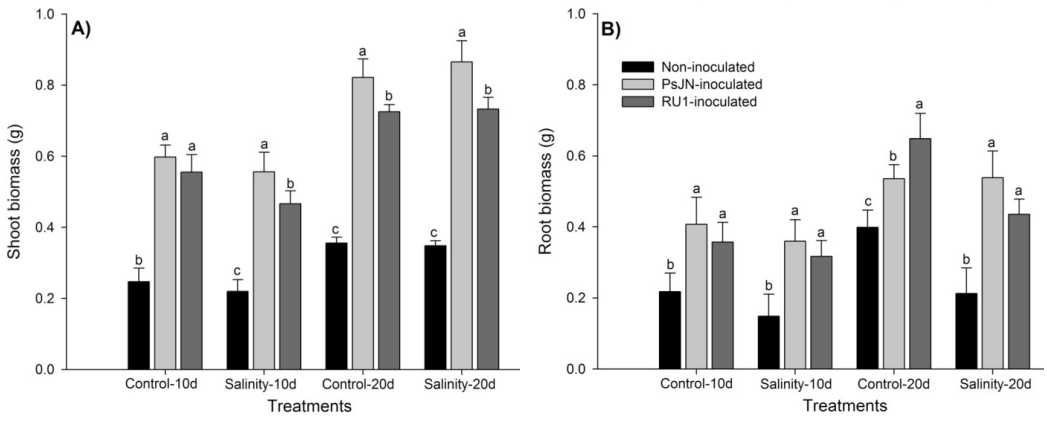
Figure 1.

Shoot biomass (A) and root biomass (B) of RU1, PsJN inoculated and non-inoculated perennial ryegrass at 10 and 20d of well-watered and salinity conditions (DAT). LSD bars and different letters atop bars indicate significant differences exist at $P \leq 0.05$ within each group (non-inoculated, PsJN inoculated, RU1 inoculated). (Cheng et. al., 2016)



USDA Photo by Dave Kosling of drought stricken corn in 2012 | USDA is an equal opportunity provider, employer, and lender