Determining the Most Effective Salt Concentration of Irrigation Water for Trichoderma harzianum to Confer Salt Tolerance through Symbiosis to Oryza sativa Plants

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As Earth's climate continues to rapidly change, rising sea levels and pressure on fresh water reserves has made many staple crop plants, especially rice, extremely vulnerable. With arable coastal land quickly becoming salty and unconducive to plant growth, it is more important now than ever to discover new ways to grow important crops in harsher environments. This project sought to find how different concentrations of salt in irrigation water affect rice plants in symbiotic relationships with the Trichoderma harzianum fungi species versus rice plants by themselves, testing the hypothesis that symbiotic plants irrigated with the highest salt water concentration will be the fittest. Rice plants with and without symbiotic relationships with the fungi species were grown for six weeks and irrigated with a range of solutions from fresh water to 300 mM salt water. The height of each plant, along with its color and wiltage on a 1-5 scale were measured each week as indication of its healthiness. The hypothesis was confirmed, showing that the plants grown in conjugation with the fungi and irrigated with a 300 mM salt water solution were the healthiest in terms of their growth rate, color and wiltage level, with a p-value of 0.002. This experiment showed the most efficient ways of utilizing fungal symbiosis in rice plants and taking advantage of the increased salt levels in coastal soils to generate healthier crops. These results can be applied to improve crop growth in the salt-degraded areas which compose 20 percent of the world's irrigated land.

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