Impact of Treading on Rice Growth: A Comparative Analysis Across Representative Varieties

Ueno, Ryoko (School: Notre Dame Seishin Gakuen Seishin Girl’s High School)

This study aimed to compare and scientifically verify the growth changes resulting from tread pressure in seven rice varieties: Koshihikari (japonica rice), IR8, Basmati-370 (indica rice), Sally Queen (a crossbreed of japonica and indica rice), Oryza glaberrima 48, and TOG 5236 (African rice). To simulate treading, a 500 mg weight was placed on rice plants at a height of approximately 3 cm for 5 min/day for 5 days. Then surveyed the changes in growth. Treading was found to increase leaf length by 0.7 times and stem thickness also increased 1.2-fold in all varieties. And in Koshihikari, the size of the cells under the leaf injury created by treading was smaller. Root angle was increased upon treading in Sally Queen, IR8 and O. glaberrima 48, but was decreased in Koshihikari, Basmati 370, and TOG 5236. Additionally, ground from the roots was more influential on the angle of the roots in Koshihikari than treading on the rice, which causes injury. The expression of the DRO1 gene, a gene involved in gravitropism, was reduced in Koshihikari rice plants, which had a smaller root angle due to treading the rice. Expression levels of the disease resistance genes, NPR1 and WRKY45 genes, were increased in Koshihikari. Thus, it is possible that disease resistance was increased. Treading on rice does not require any special machinery or advanced techniques, further it can reduce the risk of plants falling over and diseases, leading to a stable harvest.

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