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Comparative analysis of growth, yields and grain quality of rice among no-tillage dry-seeding, wet-hill-seeding and transplanting

Jong-Seo Choi*, Sook-Jin Kim, Shingu Kang, Jeong Hwa Park, Young-Hwan Yoon and Woonho Yang

Department of Central Area Crop Science, National Institute of Crop Science, Suwon, 16613, Korea

Abstract

No-tillage practices are expected to provide several benefits such as increasing soil organic matter, reducing labor time and saving energy cost compared with conventional tillage practices. This study was conducted to investigate the effects of no-tillage dry-seeding on rice growth and soil properties in comparison with other rice cultivation methods, machine transplanting and wet-hill-seeding on puddled paddy. Rice seedling establishment was slightly higher in no-tillage dry-seeding treatment (145 seedling m^{-2}) than wet-hill-seeding on puddled paddy treatment (111 seedling m^{-2}), but the seedling establishment in both treatments fell within the optimum range for direct seeding rice cultivation. Plant height, number of tillers and chlorophyll content (SPAD value) of rice in no-tillage dry-seeding treatment were higher than those of the other treatments. However, no significant differences in grain yield was observed among three cultivation methods, and the yield ranged 5.8 to 5.9 ton ha^{-1}. The heading date from seeding under no-tillage dry-seeding treatment was on average 109 days, which was similar to that under machine transplanting treatment (112 days), but 10 days later than that under wet-hill-seeding on puddled paddy treatment (99 days). Grain quality characteristics grown in no-tillage dry-seeding were similar to those grown in the other cultivation methods. These results indicate that no-tillage dry-seeding practice is comparable to conventional tillage system in terms of seedling establishment, growth, yields and grain quality.

Keywords: no-tillage, direct seeding, wet-hill-seeding, transplanting, paddy

Corresponding author*
Jong-Seo Choi
Address : National Institute of Crop Science, Suwon, 16613, Korea
Tel and Fax : 031-695-4134 / 031-695-4095
E-mail : hbell7@korea.kr