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Effect of sowing italian ryegrass using unmanned helicopter under the established rice field on labour saving and rice growth

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Abstract

Common sowing method of italian ryegrass (IRG) has been using the backpack seed sprayer (BSS) in Korea. It has weak point including a hard work and a little sowing area. This study was conducted to find out the effects of sowing IRG using unmanned helicopter (UH) under the established rice field. We checked the labour saving of sowing IRG and the growth and yield of rice after using IRG as forage crop. Two sowing implements(using by UH and backpack seed sprayer (BSS)) were tested for the ability of sowing IRG. For proper pretreatment of IRG seeds for aerial sowing using with UH, we tested one-day soaking seeds, iron-coated seeds, coated seeds sold in stores and untreated seeds. Aerial sowing of IRG seeds using UH was tested under the speed 10km/h and flying altitude 3~4m. We tried to confirm the effects on rice growth in a paddy field after IRG had been used as forage in mid May. In 6 hours of seeding per day, UH had a seeding area of 21.8 hectares, three times wider than BSS. UH had a decrease of about 63 percent of sowing-seed cost in comparison with BSS. In the IRG aerial sowing using UH, coating seeds had the wider sowing width of 5~6 meter than 3~4 meter untreated seeds. Residual dry matter of IRG after using forage had 4.5 ton per hectare and 20 percent of top dry matter. The amount of nitrogen remaining in residual IRG in the soil was 12 kg per hectare, and the other nutrients such as calcium and potassium was incorporated into the soil with less than 10 kg/ha. The rice yield after the harvesting IRG was 5 percent higher than that of rice single cropping. Consequently, IRG sowing using UH was effective in reducing sowing time and sowing cost compared with conventional methods and, it is considered that there is a positive effect on the rice cultivation compared to rice single cropping.

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