P248

Effects of cultivation methods on methane emission in rice paddy

Sukjin Kim[1)*], Jong-Seo Choi[1)], Shin-gu Kang[1)], Jeong-wha Park[1)] and Woonho Yang[1)]

[1)] *Crop Cultivation & Environment Research Division, National Institute of Crop Science, RDA, Suwon 16430, Korea*

Abstract

Methane is the main greenhouse gas released from rice paddy field. Methane from paddy fields accounts for 11 % of the global total methane emission. The global warming potential (GWP) of methane is 25 times more than that of carbon dioxide on a mass basis. It is well known that most effective practice to mitigate methane in paddy is related to the water management during rice growing season and the use of organic matters. This study was conducted to investigate the effects of tillage and cultivation method on methane emission in paddy. Tillage (tillage and no-tillage) and cultivation methods (transplanting and direct seeding) were combined tillage-transplanting (T-T), tillage-wet hill seeding (T-W), tillage-dry seeding (T-D) and no-till dry seeding (NT-D) to evaluate methane mitigation efficiency. Daily methane emission was decreased on seeding treatments (T-W, T-D, NT-D) than transplanting treatment (T-T). Amount of methane emission during rice growing season is highest in T-T (411.7 CH_4 kg ha^{-1} y^{-1}) and lowest in NT-D treatment (89.7). In T-W and T-D treatments, methane emissions were significantly decreased by 36 and 51 % respectively compared with T-T. Methane emissions were highly correlated with the dry weight of whole rice plant (R^2=0.62~0.93). T-T treatment showed highest R^2 (0.93) among the four treatments. Rice grain yields did not significantly differ with the tillage and cultivation methods used. These results suggest that direct seeding practice in rice production could mitigate the methane emissions without loss in grain yield.

Keywords: Methane, rice, paddy, tillage, direct seeding

Corresponding author*
Sukjin Kim
Address: 84 Suin-ro, Gwonseon-gu, Suwon, 16430, Republic of Korea
Tel and Fax: T) 031-695-4136, F) 031-695-4095
E-mail: ksj8827@korea.kr