

# Influence of many times inter-tillage weeding on rice growth and nitrogen dynamics in the paddy field without fertilizers and agricultural chemicals in 2018 and 2019

環境資源学専攻 地域環境学講座 土壤物理学 Zhou Peiyang

## 1. Introduction

It is reported that many times inter-tillage weeding without agricultural chemicals and fertilizers for rice cultivation can bring the high yield and good quality of rice. Moreover, the method is friendly to environment. However, its influences on nutrient dynamics are unknown.

## 2. Methods

In this research, we set 0-time, 2-time, 5-time inter-tillage plots without fertilizers and agricultural chemicals and control plot with fertilizers and agricultural chemicals. We measured nitrogen concentrations, and rice growth in all plots in 2018 and 2019. The brown rice yields were 547 g/m<sup>2</sup> (0-time), 531 g/m<sup>2</sup> (2-time), 566 g/m<sup>2</sup> (5-time), and 325 g/m<sup>2</sup> (control) in 2018.

## 3. Results and Discussion

The average in Hokkaido was 494 g/m<sup>2</sup>. No significant difference was observed among the inter-tillage field. However, they were higher than the control field and the average in Hokkaido. The lower yield in the control field may be resulted from the uncompleted decomposition of distributed rice straw after former harvest. The brown rice yields were 240 g/m<sup>2</sup> (0-time), 227 g/m<sup>2</sup> (2-time), 282 g/m<sup>2</sup> (5-time), and 702 g/m<sup>2</sup> (control) in 2019. The lower yield in inter-tillage field may be resulted from lower NH<sub>4</sub><sup>+</sup>-N concentration in the soil. The significant difference of rice yield among the different inter-tillage weeding plot was not observed. However, the yield in 5-time plot was slightly higher than those in 0-time plot and 2-time plot in both years, because there was higher NH<sub>4</sub><sup>+</sup>-N concentration in 5-time plot compared with 0-time and 2-time plot. Biomass nitrogen and total nitrogen in soil solution in 5-time plot were also relatively higher than those in 0-time plot and 2-time plot in both years. The result suggested that many times inter-tillage could improve yield and soil condition in some degrees. However, several years will be needed to get a definite result of inter-tillage weeding because the research has been conducted for only 2 years.