p6. Environment-Friendly Rice Cultivation with Reduction of Pesticide and Chemical Fertilizer Usage in Katsurao Village in Fukushima Prefecture, Japan

Wataru MATSUZAKI, Toru UNO, Ryosuke TAJIMA, Masanori SAITO and Toyoaki ITO

Graduate School of Agricultural Science, Tohoku University

Agriculture of Fukushima prefecture was seriously damaged by the Fukushima first nuclear power plant accident in 2011. It was equal Paddy rice cultivation was forbidden for five years after the accident also in Katsurao village in Fukushima. However, in 2017, the prohibition of rice production was withdrawn in a wide area of Katsurao village. To introduce environmentally conscious rice cultivation will be effective in restoring rice agriculture in Katsurao Village because environmental conservation may be valuable for raising agricultural products value and farmer's income. Then, in this study, we conducted environmentally conscious rice cultivation with reduction of pesticide and chemical fertilizer (ECRC) in Katsurao village and compared the rice yields of ECRC and conventional rice cultivation (CRC).

We investigated four pairs of paddy fields including ECRC and CRC fields (A, B, C, D sites). Rice varieties were 'Hitomebore' at three sites and 'Satoyamanotubu' at D site. For fertilization, mixed fertilizer containing 50% chemical fertilizer and 50% organic fertilizer and chemical fertilizer were used in ECRC and CRC fields, respectively with nitrogen application rate of 7 kg/10a. Pesticides were applied according to local conventional system in CRC fields. On the other hand, one (active ingredient: thiamethoxam) of the insecticides used in the conventional treatment was not applied in ECRC fields. During cultivation period, we surveyed rates of leaves damaged by rice water weevils (*Lissorhoptrus oryzophilus*) and rice leaf beetles (*Oulema oryzae*), that occurred in the early rice growth season. We investigated brown rice yield and yield components. The leaf rates damaged by the two insects did not differ significantly between different cultivation systems (n = 4). Reduction of insecticide did not enlarge plant damage suffered by insect pests. Brown rice yields of ECRC increased by 9% and 3% compared with CRC in A and B sites, respectively. In contrast, they decreased by 7% and 31% in C and D sites, respectively. For yield components, panicle numbers per unit area decreased remarkably in C site (12.4%) and D site (19.1%). In D site, lower amounts of soil organic matter (low nitrogen fertility) may result in decreasing yield for ECRC field. In ECRC system, half of applied nitrogen fertilizer was organic fertilizer and its mineralization proceeded slowly and imperfectly. However, brown rice yields and yield components were not significantly different between two cultivation systems (one-way AOV, n = 4). Consequently, in semi-mountainous areas in Fukushima prefecture (Katsurao village), environmental conscious rice cultivation system, including reduction of chemical fertilizer and insecticide, may be able to produce rice yields comparable to conventional system.