

Breeding of the Environmental Awareness of Citizen through Dragonfly Investigation at Niigata,  
JAPAN

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Paddy fields provide a home for a wide variety of living things, i.e., rice, dragonfly, earthworm. Red dragonfly is one of the most important creatures at paddy fields in Japan. Unfortunately red dragonflies decrease rapidly in these days. Hence, we surveyed the present condition of the ecosystem of paddy field through the dragonflies' survey in cooperation with rice farmers from 2011 to 2013 at Niigata prefecture, Japan. This survey was consisted of the collection of dragonfly exuviae and the questionnaires on the procedures of rice productions and the oviposition of dragonflies. In the questionnaires, we asked water management, pesticide usage, and rice varieties to farmers. The accumulated number of paddy fields was 167 in 3 years. Three species red dragonflies (*Sympetrum frequens*, *Sympetrum darwinianum* and *Sympetrum infuscatum*) were the target. The total number of collected exuviae was 4413 in 3 years. We analyzed the correlations among water management, pesticide usage and the number of dragonfly exuviae. Furthermore, we monitored the procedure of oviposit dragonflies at several rice fields at the end of October. From the survey, we found that, 1) *Sympetrum frequens* was the dominant species of dragonfly in Niigata prefecture, 2) end of June was the peak period of emerge of dragonfly larvae, 3) mid-summer drainage had negative impact into the habitat of dragonfly, 4) dragonflies tend to oviposit at the rice field, which submerged shallow water, apart from insecticide application, in sunny days, 5) the seed-box insecticide, especially Neonicotinoid type, affected negatively to the habitat of dragonflies. According to the questionnaires, almost every rice farmer participated positively in this dragonfly survey. However, the collection rate of questionnaire decreased 62% at the third year 2013. Consequently the dragonfly survey had the benefit to analyze the paddy ecosystem, and should improve constantly to breed the environmental awareness of citizen.

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