



Effects of raising frogs and putting pest-killing lamps in paddy fields on the prevention of rice pests and diseases

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Frogs in paddy fields become less and less due to applying large amounts of pesticides and human hunting for a long time, which causes the aggravation of rice pests and diseases. A field experiment was carried out in the suburb of Shanghai to study the effects of artificially raising frogs and putting frequency oscillation pest-killing lamps in paddy fields on the prevention of rice pests and diseases. The field experiment includes three treatments. Treatment I: 150 frogs, each 20 g in weight, per 100 m² were put in the fields; Treatment II: a frequency oscillation pest-killing lamp was put in the fields; Treatment III: no frogs and pest-killing lamps were put in the fields. All the experimental fields were operated based on the organic farming system. The amount of organic manure, 7500 kg/hm², was applied to the fields as base fertilizer before sowing in early June, 2013. No any chemical fertilizers and pesticides were used during the entire period of rice growth. Each treatment is in triplicate and each plot is 67 m² in area. The results are as follows: (1) During the entire growth period, the incidences of rice pests and diseases with Treatment I and II are significantly lower than those with CK (Treatment III). The incidence of chilo suppressalis with Treatment I, II and III is 0, 0.46% and 1.69%, respectively; that of cnapalocrocis medinalis is 7.67%, 6.62% and 10.10%, respectively; that of rice sheath blight is 0, 11.11% and 5.43%, respectively; that of rice planthopper is 4.25 per hill, 5.75 per hill and 11 per hill, respectively. (2) The grain yield of the three treatments is significantly different. That of Treatment I, II and III is 5157.73 kg/hm², 4761.60 kg/hm² and 3645.14kg/hm² on average, respectively. (3) Affected by frog activities, the contents of NH₄-N, available P and available K in the soil with Treatment I are significantly raised. All the above suggest that artificially raising frogs in paddy fields could effectively prevent rice pests and diseases, especially reduce the incidences of rice sheath blight and chilo suppressalis, and setting pest-killing lamps could also effectively control rice pests, but not rice sheath blight, which contribute to the increase of grain yield largely. Moreover, the activity of frogs in paddy fields could improve soil fertility and increase bio-diversity. Acknowledgements: This work was supported by the National Natural Science Foundation of China (No. 41130526).