



Influence of fertilization on the capability of rice resistance to diseases

Xue-Feng Hu, Yue-Ya Chang, Ying Jiang, Xiao-Juan Yan, and Fan Luo

School of Environmental and Chemical Engineering, Shanghai University, Shanghai 200444, China (xfhu@shu.edu.cn)

Organic cultivation of rice requires no use of any agricultural chemicals during the entire period of growth, and so the rice's self-prevention of diseases and pests is vitally important. A field experiment was carried out to study the possible influence of different fertilization on the capability of rice resistance to diseases and pests. A rice variety used for this experiment is Jia-He 218. Four treatments (A, B, C and D) were designed: A is a control, without using any fertilizers; B, after manuring of green azolla, 0.67 kg/m²; C, after manuring of rapeseed cake, 0.30 kg/m²; D, after fertilizing of ammonium bicarbonate, 0.025 kg/m², and urea, 0.025 kg/m². The experiment plot is 66.7 m², with three replicates. The results indicated that the fertilization patterns significantly influence the growth of rice seedlings: The heights by A, B, C and D are 37 cm, 40 cm, 42 cm and 45 cm on average, respectively; the spike numbers, 45, 65, 73 and 75, respectively; chlorophyll contents in leaves, 1.84 mg/g, 2.42 mg/g, 3.02 mg/g and 3.97 mg/g, respectively. The rice with the different fertilization also varies in nutrient concentration in leaves: NH₄-N concentration in leaves by A, B, C and D is 47.5 mg/kg, 61.1 mg/kg, 74.7 mg/kg and 135.8 mg/kg on average, respectively; NO₃-N in leaves, 138.9 mg/kg, 185.2 mg/kg, 154.3 mg/kg and 293.2 mg/kg, respectively. The fertilization patterns, moreover, show a significant influence on the incidence of diseases and pests to rice seedlings: The incidence of rice *cnaphalocrocis medinalis* by A, B, C and D is 1.33 %, 1.50 %, 1.75 % and 89.0 % on average, respectively; that of bacterial leaf blight, 0, 1.25 %, 1.75 % and 85.0 %, respectively; number of rice planthopper in each plant, 20, 21, 21 and 30, respectively. As a result, the yield of rice grain by A, B, C and D is 4540 kg/ha, 4606 kg/ha, 4503 kg/ha and 4092 kg/ha on average, respectively. In conclusion, the rice seedlings treated with chemical fertilizers grow large and tender, which makes it more vulnerable to diseases and pests, resulting in low grain yield. In addition, its immune system capability might be significantly reduced by hyper-accumulation of free nutrients in leaves or stems due to excessive application of chemical fertilizers, and thus leaving it more seriously attacked by diseases and pests.