

Biodiversity and Dynamics of Planthoppers and Their Natural Enemies in Rice Fields with Different Nitrogen Regimes [PDF]

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摘要: A field experiment was conducted to study the effect of different nitrogen fertilizer rates i.e. 200, 100 and 0 kg N/ha in paddy fields at International Rice Research Institute, Manila, Philippines. Biodiversity of arthropods sampled by Blower-Vac, and dynamics of planthoppers, egg parasitoids of Homoptera trapped by rice plants with eggs of brown planthoppers (BPH) *Nilaparvata lugens* (Stål), and web spiders on rice canopy collected by sweeping net, were analyzed at different rice growth stages. The most abundant arthropods were sampled at the milking stage of rice, totalling 116 species identified into 14 insect orders and 15 species of spider in all samples. Meanwhile the number of arthropod species significantly increased with rice growth and the diversity indices increased with the increase of nitrogen rate at the booting stage. On the other hand, in the dominant predators, *Pardosa pseudoannulata*, *Callitrichi formosana*, *Micraspis* sp., *Cyrtorhinus lividipennis*, *Veliidae* sp. and *Mesoveliidae* sp., only *C. lividipennis* and *Micraspis* sp. were increased significantly in abundance following the application of nitrogen at the milking stage of rice. The egg parasitoids of plant-hoppers were predominated by *Anagrus flaveolus* and *Oligosita* sp. and their densities in the field without nitrogen fertilizer were markedly higher than those in fields with 100 and 200 kg N/ha at both booting and milking stages of rice. The number and web area of dominant residential spiders *Tetragnatha* sp. and *Araneus* sp. in rice canopy significantly reduced with the increase of nitrogen fertilizer. The population density of planthoppers, included BPH and the white-backed planthoppers (WBPH) *Sogatella furcifera* Horváth, peaked during the booting stage, however, the number of BPH in rice field with 200 kg N/ha was considerably higher than those in other two rice fields with 100 kg N/ha and 0 kg N/ha at the booting as well as the milking stage. These results indicated that the rapid growth in populations of planthopper due to excessive nitrogen might be attributed to the combination of reduction in control capacity of natural enemies and strong stimulation of nitrogen to planthoppers.

关键词: *Nilaparvata lugens*; nitrogen fertilizer; biodiversity; natural enemy; rice field; biological control

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