COMPOSITION AND COMMUNITY STRUCTURE OF THE AQUATIC INVERTEBRATES IN AN IRRIGATED RICE FIELD ECOSYSTEM

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ABSTRACT

Rice fields are man-made, temporary aquatic habitats which harbour a rich and varied group of plants and animals. In an attempt to document the aquatic invertebrate fauna inhabiting rice fields, a study was carried out in an irrigated rice field ecosystem at Bathalagoda. Sampling of rice field water and soil was carried out at fortnightly intervals throughout the aquatic phase of five consecutive rice cultivation cycles. The aquatic invertebrate communities examined included neuston, zooplankton, nekton, periphyton and benthos. A total of 171 aquatic invertebrate species belonging to 9 phyla were recorded, with Arthropoda as the dominant phylum (90 spp.). Among the invertebrates collected were 8 species that had not been documented from Sri Lanka previously. The 65 species of insects recorded were represented by 35 species of predators and 14 species of mosquitoes which included the major vector of Japanese Encephalitis in Sri Lanka. The arthropods also included 8 species of minor pests of rice. Of the different communities of aquatic invertebrates, nekton and periphyton contained the highest number of species (61 spp.), closely followed by the benthos (60 spp.) Insects belonging to the Order Heteroptera formed the major neustonic group while the zooplankton was dominated by crustaceans (20 spp.). The nektonic and periphytic community was dominated by adult and larval insects (50 spp.). Nematodes were the most abundant benthic group (8 spp.). Majority of the aquatic molluscs were benthic forms (7 spp.) followed by periphytic forms. Use of weedicides, insecticides and fertilizer in cultivation resulted in differential fluctuations of all the invertebrate communities. The diversity of the aquatic invertebrate communities that inhabit the rice fields would enrich the ecosystem and help in the recycling of nutrients. It lends itself to a study of an ecosystem within everyone's reach.

INTRODUCTION

Rice fields are mostly converted or extended marshes, maintained by man for the purpose of cultivating rice. Hence, rice fields are a unique man-made agroecosystem. Rice is cultivated either under irrigated or rainfed conditions and therefore rice fields are contiguous with surrounding marshes, tanks, streams and irrigation channels. Although rice fields are temporary aquatic habitats, they are the largest man-made fresh water habitat in Sri Lanka, covering an extent over 780,000ha.

The aquatic habitat of rice-fields generally harbours a rich and varied group of plants and animals. The aquatic invertebrate animals inhabiting the rice field water have been broadly divided into **neuston** that include surface dwelling insects, **zooplankton** which includes minute organisms such as protozoans, micro-crustaceans and rotifers, **nekton** which includes aquatic insects and their larvae and **benthos**, which includes bottom dwelling annelid worms, nematodes and molluscs (Heckman, 1974, 1979; Fernando, 1993, 1995; Halwart, 1994). The importance of the aquatic invertebrates inhabiting rice fields is evident by the comprehensive