

Biodiversity associated with an irrigated rice agro-ecosystem in Sri Lanka

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Abstract. Irrigated rice fields are temporary wetland agro-ecosystems, managed with a variable degree of intensity. A survey was carried out in Sri Lanka to document the overall biodiversity associated with this unique agro-ecosystem, using a combination of sampling techniques to document different groups of fauna and flora. The total number of biota recorded and identified from the rice field ecosystem during the entire study period consisted of 494 species of invertebrates belonging to 10 phyla and 103 species of vertebrates, while the flora included 89 species of macrophytes, 39 genera of microphytes and 3 species of macrofungi. Of the total species documented, 15 species of invertebrates and one weed species are new records to Sri Lanka. Arthropods were the dominant group of invertebrates (405 species), of which 55 species were rice pest insects, and 200 species were natural enemies of pest insects. The fauna and flora recorded from the rice field were observed to follow a uniform pattern of seasonal colonization and succession during successive rice cultivation cycles. The biodiversity of the irrigated rice agro-ecosystem interests both agroecologists and conservation biologists. Therefore, the integrated efforts of these two groups can result in the formulation of strategies based on biodiversity as an organizing principle in the sustainable management of the rice field agro-ecosystem.

Introduction

Until the late 1980s, the prime focus of biological conservation was on undisturbed natural habitats, including protected areas that cover only about 5% of the world land area. However, the focus on undisturbed habitats was challenged at the dawn of this decade, when attention was called to the fact that at least two-thirds of the terrestrial environment of the planet consisted of managed ecosystems, including agricultural systems, forestry systems and human settlements (Western and Pearl 1989; McNeely 1995). Hence, a large portion of the world's biological diversity coexists in these ecosystems. Since then, scientists have begun to focus their attention on agricultural and forestry systems. There is growing evidence that traditional agro-ecosystems such as rice fields contribute to sustain the regional biodiversity of many invertebrate and vertebrate species (Lawler 2001). The study of biodiversity associated with agro-ecosystems such as rice fields is of significance for agroecologists and conservation biologists, since maintenance of biological diversity is essential for productive agriculture, and ecologically sustainable