

ON THE DIVERSITY OF AQUATIC INSECTS OF POLACHIRA WETLAND ECOSYSTEM IN KERALA

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The diversity of aquatic insects are frequently used to assess environmental water quality status and health of aquatic ecosystems. This paper documents the diversity of aquatic insects in a wetland ecosystem represented by 7 orders and 33 families of 37 genera. The family Hydrophilidae showed maximum individual diversity followed by the order Hemiptera with 8 families, each order Odonata with 7 families, order Ephemeroptera and Coleoptera with 5 families, order Diptera with 3 families, order Collembola with 2 families and Plecoptera with 1 family. The present study revealed that Polachira wetland system is rich in the diversity of aquatic insects. However the insect fauna of this wetland is under threat due to habitat modification, reclamation of paddy fields, poaching, domestic wastes and human activities. Sustainable management and careful monitoring are to be ensured for the conservation of the rich biodiversity of this wetland ecosystem.

Key words : Diversity, Aquatic insects, Hydrophilidae, Hemiptera, Ephemeroptera, Coleoptera, Diptera, Collembola, Plecoptera.

INTRODUCTION

Aquatic insects play an important role in ecosystem functioning, especially in nutrient dynamics, primary production, decomposition and material translocation. The diversity of aquatic insects is one of the most important characteristics of an aquatic ecosystem. About 5,000 species of aquatic insects are estimated to inhabit the wetlands of India (Subramanian & Sivaramakrishnan, 2007). Aquatic insects are most commonly used for the biomonitoring of freshwater habitats. In addition to this insects are very good indicators of human impact on the freshwater ecosystems. The distribution of aquatic insects is quite variable because of geological and geographical conditions. The basic objective of the present study is to document the aquatic insect community of the Polachira wetland ecosystem. Hardly no reports on the study of the insect fauna of the Polachira wetland ecosystem is available, the present attempt is expected to be the first of this kind.

MATERIALS AND METHODS

The study was carried out at Polachira, one of the important wetlands of the Kerala Coast, located in the Southern part of Kollam district. It spreads over 600 hectares of sprawling land at an average depth of 1m below ground level. A large number of birds have been sighted at Polachira as a result of the biodiversity. For the present investigation insects were collected randomly from 5 stations. Samples were collected bimonthly during the period of one year from October 2012 to September 2013.

Aquatic insects were collected using a hand net made of mosquito curtain cloth. The collected materials were washed with running water through the nets thrice to detach the insects / larvae adhered to the nets. The organisms trapped were collected without any damage and preserved in 90% ethyl alcohol and brought to the laboratory for further identification. The collected samples were examined under dissection microscope. Genus level identifications were made using standard taxonomic keys. The following keys are used for identification (Morse *et al.*, 1994; Harmer & Mellanby, 1997; Tonapi, 1980; Fitter & Manuel, 1986).

RESULTS AND DISCUSSION

The health of the environment decides the diversity and productivity of the system. A total 37 individuals of aquatic insects were collected during the period of study. These belong to 7 orders and 33 families represented by 37 genera. The family Hydrophilidae showed maximum individual diversity followed by the order Hemiptera with 8 families, Odonata with 7 families, Ephemeroptera and Coleoptera with 5 families, each Diptera with 3 families, Collembola with 2 families and Plecoptera with 1 family were noted during the study. The insect diversity of this wetland are presented in Table 1.

In the present study order Collembola was represented by 2 families. Family Poduridae was represented with one genus *Podura aquatica* and the family Sminthuridae with one genus *Sminthurides*.

The order Ephemeroptera consisted of 5 families represented by 6 genera. Family Ephemeridae was represented by one genus *Mayfly nymph*, family Baetidae with 2 genera *Cloeon* and *Baetis*, family Ephemerellidae with the genus *Ephemerella*, family Caenidae with the genus *Caenis* and family Leptophlebiidae with the genus *Leptophlebia*. The order Ephemeroptera was one of the sensitive group represented in this wetland by the families Baetidae and Caenidae which are considered as an indicators of water quality. Several authors have reported the tolerance of the genera, *Cloeon* sp. and *Baetis* sp to top organic pollution (Timm, 1997; Menetrey *et al.*, 2008).

The order Odonata was represented by 7 families. Family Coenagrionidae consisted of 2 genera, *Enallagma* and *Coenagrion*, family Lestidae of one genus *Lestes*, family Gomphidae of the genus *Gomphus*, family Corduliidae with the genus *Cordulia*, family Libellulidae with the genus *Sympetrum nymphs*, family Macromiidae of the genus *Macromia* and family Aeshnidae of genus *Anax*.

The order Hemiptera with 8 families dominated in the present collection. Each families belongs to one genus. Family Gerridae consisted of the genus *Gerris*, family Veliidae of the genus *Rhagovelia*, family mesoveliidae of the genus *Mesovelia*, family Corixidae with the genus *Hesperocorixa*, family Pleidae of genus *Plea*, family Nepidae of genus *Nepa*, family Belostomatidae of genus *Belostoma* and the family Notonectidae represented by the genus *Notonecta*.

The order Diptera comprised of 3 families represented by Chironomidae, Chaoboridae and Culicidae. Family Chironomidae consisted of a single genus *Chironomus*. Family Chaoboridae consisted of the genus *Chaoborus* and the family Culicidae of genus *Mosquitoes*. Many of the dipterians inhabits in heavily polluted water

Table 1. The Diversity of Aquatic Insects of Polachira Wetland Ecosystem in Kerala during the period from October 2012 to September 2013.

S. No.	Order	Family	Genus
1.	Collembola	Poduridae	<i>Podura aquatic</i>
		Sminthuridae	<i>Sminthurides</i>
2.	Ephemeroptera	Ephemeridae	<i>Mayfly nymph</i>
		Baetidae	<i>Cloeon</i>
			<i>Baetis</i>
		Ephemerellidar	<i>Ephemerella</i>
		Caenidae	<i>Caenis</i>
		Leptophlebiidae	<i>Leptophlebia</i>
3.	Odonata	Coenagrionidae	<i>Enallagma</i>
			<i>Coenagrion</i>
		Lestidae	<i>Lestes</i>
		Gomphidae	<i>Gomphus</i>
		Corduliidae	<i>Cordulia</i>
		Libellulidae	<i>Sympetrum nymphs</i>
		Macromiidae	<i>Macromia</i>
4.	Hemiptera	Aeshnidae	<i>Anax</i>
		Gerridae	<i>Gerris</i>
		Veliidae	<i>Rhagovelia</i>
		Mesoveliidae	<i>Mesovelia</i>
		Corixidae	<i>Hesperocorixa</i>
		Pleidae	<i>Plea</i>
		Nepidae	<i>Nepa</i>
		Belostomatidae	<i>Belostoma</i>
5.	Diptera	Notonectidae	<i>Notonecta</i>
		Chironomidae	<i>Chironomus</i>
		Chaoboridae	<i>Chaeoborus</i>
6.	Coleoptera	Culicidae	<i>Mosquitoes</i>
			<i>Hydrochus</i>
			<i>Hydrobius</i>
		Hydrophilidae	<i>Hydrophilus</i>
			<i>Platambus</i>
		Hygrobiiidae	<i>Hygrobia</i>
		Hydraenidae	<i>Hydraena</i>
		Dyticidae	<i>Hydaticus</i>
			<i>Noterus larvae</i>
7.	Plecoptera	Laccophilinae	<i>Laccophilus</i>
		Leuctridae	<i>Leuctra</i>

bodies with wide range of tolerance (Abhijna *et al.*, 2012). According to Courtney (2009), the larvae of most species can be considered aquatic in the broadest sense and they require a moist to wet environment within the tissue of living plants and amid decaying organic materials.

The order Coleoptera was represented by 5 families Hydrophilidae, Hygrobiidae, Hydraenidae, Dyticidae and Laccophilinae. The family Hydrophilidae consisted of 3 genera *Hydrochus*, *Hydrobius* and *Hydrophilus*. Family Hygrobiidae consisted of 2 genera *Platambus* and *Hygrobia*. Family Hydraenidae consisted of a single genus *Hydraena*, and family Dyticidae of 2 genera, *Hydaticus* and *Noterus larvae*. The family Laccophilinae was represented by one genus *Laccophilus*.

The order Plecoptera of the family Leuctriadae was represented by a single genus *Leuctra*. According to Fore *et al.* (1996) the order Plecoptera is highly sensitive to environmental degradation.

Remarks : Wetland insects play a prominent role in primary production and serve as an important food source for higher trophic levels, including a large number of fishes, invertebrates and avian species. The present study revealed that Polachira is rich in the diversity of aquatic insects. But this biodiversity is under threat from habitat modification, reclamation of paddy fields, Poaching, domestic wastes and the atmospheric pollution caused by stone crusher units and the presence of brick factories. The high intensity noise of the units and the huge amount of dust were listed as reasons for the the destruction of this wetland. Sustainable management and careful monitoring are to be ensured for the conservation of the rich biodiversity of this wetland ecosystem.

ACKNOWLEDGEMENT

The authors are thankful to the Principal, Sree Narayana College, Kollam for the facilities provided. The first author is grateful to the University of Kerala for providing financial assistance as JRF to carry out the present work.

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(Manuscript Received : June 2014)