

A Study on the Diversity of Aquatic Insect Communities of Kaliabor Subdivision, Nagaon, Assam

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ABSTRACT

Aquatic insects hold an important place in the ecology of freshwater ecosystem. The present study deals with the aquatic insects survey conducted from January 2018- March 2018 in three permanent water bodies of Kaliabor, Nagaon district, Assam. During the study all total 28 species of aquatic insects have been recorded belonging to six orders and 18 families. Different groups of insects have different tolerance to the quality of the water in which they live. Due to the diversity of insects, each different group relies on a different set of conditions in order to survive. According to this study, the order Hemiptera represents the highest number of species (Nine families including 15 genera). Coleoptera (three families including four genera), Odonata (two families including four genera), Diptera (two families including two genera), Ephemeroptera (one family including two genera), Hymenoptera (one family including one genera) were recorded during this work. Water quality parameters in the three sites don't show significant differences. Dissolved oxygen is found to be highest in Solong beel and also the total number of insect species present are high at this site followed by Kolong river and Jaysagar doloni.

Key words: Aquatic insects, Diversity, Water quality, Environment, Conservation.

I. INTRODUCTION

Although many of the insects we know from our house and gardens are pests, the majority of insects found in lakes and pools are helpful and friendly members of the environment. Aquatic insects, a group of Arthropods, live their life cycle in water bodies and are found in or on the surface of the lentic or lotic water bodies. Aquatic insects hold an important place in the ecology of freshwater ecosystem. The relationship that exists between insects and other members of the wetland is the fundamental component of any ecosystem. They are important food for many aquatic living beings including fish, amphibians, and aquatic birds. Besides these they may also be considered as predators feeding on different zooplanktons or phytoplanktons and to some extent on small fish also. They are also important as degraders of organic matters, which they break and

make available to the other organisms of aquatic ecosystem. So they play an important role in aquatic food chain. Insects are found in almost every aquatic ecosystem, from storm water drains to swimming pools. Aquatic insects play a crucial role for informing us about the water quality of a particular environment. Aquatic insects are specialized for filtering fine particles that are suspended in the water. This is useful because it helps to keep the water clear enough for light to penetrate where algae and other plants are growing on the bottom. Burrowing of soft bottom sediments in search of food also makes the bottom healthier for organisms because it puts oxygen from the water into the bottom. Different groups of insects have different tolerance to the quality of the water in which they live. Due to the diversity of insects, each different group relies on a different set of conditions in order to survive. Some groups (such as mosquito larvae) can tolerate water that has many of

the conditions we recognise as poor quality (such high temperature, very low pH and large nutrient levels). Other insect groups are very sensitive to poor water quality (including most Mayfly and some Caddisfly larvae). They will only be found in bodies of water with the cleanest conditions (including high oxygen availability, low nutrient loads and moderate pH). The changes in physico chemical properties of water can adversely effect the diversity ,distribution and composition of aquatic insects. The ecology of many insect group is well studied owing to their roles as bio indicator i.e living organisms that indicate the quality of their environment by their presence or absence ,or disease vector but still there are large number of insects species, whose ecology is yet to be explored. Present study was conducted to collect data on distribution and diversity of aquatic insects in a part of Kaliabor subdivision taking three water bodies as study site.

II. METHODS AND MATERIAL

2.1 Study area: The field work was carried out on three permanent locations selected under Kaliabor subdivision of Nagaon district, Assam. The study

areas are a part of Kolong river in the locality of Kuworitol region., Solong beel ,which is a wetland and source of its water is Brahmaputra river and Jaysagar wetland.

2.2 Time period & Sampling methods: The present work is based on the studies carried out for a period of three months , commencing from January 2018 to March 2018 (spring). Circular hand operated nets made of finely meshed polyester mosquito curtain cloths were used to collect the floating/swimming insects from the littoral zone of the studied habitat. Insects and water samples brought to the laboratory of Zoology department, Kaliabor college. Insects are preserved in 70% ethyl alcohol for identification. Identification of collected specimens were done with the help of data available in internet and standard books. Photographs were taken with digital camera.

2.3 Physico chemical parameters of water sample: Physico chemical parameters such as air temperature ,water temperature was done by thermometer and pH was calculated using universal indicator. Dissolved oxygen and free CO₂ was analysed by standard titrimatic methods.

III. RESULT

3.1 Analysis of Physico-chemical parameters:

The physicochemical parameters of the three aquatic ecosystems namely, Kolong, Solong and Jaysagar wetland are summarized in the table 1.

Table 1.Water analysis result

Study area	pH	Air temperature (° C)	Water temperature (°C)	Dissolved O ₂ (mg/lit)	Free CO ₂ (mg/lit)
Kolong	7.5	28	26	12.4	8.8
Solong	8	26	25.5	13.6	9.2
Jaysagar wetland(doloni)	7	30	26.2	10.5	6

3.2 Aquatic insects:

In the present study all total 28 species of aquatic insects have been recorded belonging to 6 order (Hemiptera, Coleoptera, Diptera, Odonata, Ephemeroptera and Hymenoptera) and 18 family. Order Hemiptera represent the highest number of species (Nine families including 15 genera), Coleoptera (three families including four genera.), Odonata (two families including four genera) Diptera(two families including two genera) Ephemeroptera (one family including two genera), Hymenoptera(one family including one genera) were recorded during this work. The details of the insects

found are given below in the table 2 and 3with their distribution.

Table 2. List showing number of insects species according to collection site

SI No.	Location	Number of species
1	Kolong	18
2	Solong	24
3	Jaysagar	09

Plate 1. Images of insects recorded



Table 3. Distribution of species according to their order ,family and location

Sl o.	Order	Family	Species	Location
1	Hemiptera	Corixidae	Micronecta scutellaris	Kolong river, solong beel, jaysagar doloni
2			Sigara alternate	Kolong river
3		Pleidae	Plea liturata	Kolong river, solong beel
4		Notonectidae	Notonecta undulate	Kolong river, solong beel
5		Naucoridae	Pelocoris femoratus	Solong beel
6		Mesovellidae	Mesovelia vittigera	Kolong river, solong beel
7		Belostomatidae	Diplonychus rusticus	Solong beel
8			Belostoma sp	Kolong river, solong beel, jaysagar doloni
9		Nepidae	Ranatra filiformes	Kolong river, solong beel, jaysagar doloni
10			Ranatra varipes	Kolong river, solong beel,
11			Nepa apiculata	Kolong river, solong beel
12		Gerridae	Gerris species	Kolong river, solong beel, jaysagar doloni
13			Neogerris parvula	Solong beel
14			Limnogonis nitidus	Kolong river
15		Veliidae	Microvelia species	Kolong river, solong beel
16	Diptera	Chironomidae	Chironomous species	Kolong river, solong beel
17		Culicidae	Culex species	Kolong river,
18	Coleoptera	Dytiscidae	Cybister fimbriolatus	Solong beel
19			Laccophilus indicus	Solong beel
20		Gyrinidae	Dineutus spinosus	Kolong river, solong beel, jaysagar doloni
21		Hydrophilidae	Hydrophilus species	Solong beel
22	Odonata	Libellulidae	Libellula lydia	Kolong river, solong beel, jaysagar doloni
23			Pantala flavescens	Kolong, Solong beel
24			Neurothemis species	Solong beel, jaysagar doloni
25		Coenagrionidae	Ischnura species	Kolong river, solong beel, jaysagar doloni
26	Ephemeroptera	Baetidae	Cloeon species	Solong beel
27			Baetis sp	jaysagar doloni
28	Hymenoptera	Formicidae	Polyrhachis sokolova	Solong beel

IV. DISCUSSION

In the present study order Hemiptera was found most diverse and abundant which is followed by Coleoptera . A significance difference in diversity of the aquatic insects between the three sampling sites under study may be attributed to the significant difference in physico-chemical parameters, habitat complexity, vegetation, depth of the water bodies. Hymenoptera and ephemeroptera are found to be less in number among all the orders, this may be due to the reason that they are highly sensitive to pollution. Among the three sites highest numbers of species were found in Solong beel and less in Jaysagar doloni. This difference may be result from various cases. The water quality of Jaysagar may not be of good quality for insects survival since some insects species are highly sensitive to changes in water parameters. Near Jaysagar doloni paddy fields are present. Run off water from this field may be contaminated by the use of chemical fertiliser or pesticides. When such water come into contact with main water of this aquatic body this may deteriorate the water quality .In this study DO is also found to be lowest in Jaysagar doloni. Less DO refers that the water may be polluted or this may also due to eutrophication. The number of recorded species belonging to heimptera in the present study signifies the rich diversity of this group in the freshwater ecosystems of Assam. Similarly, Das and Gupta(2010) also have recorded 14 species of hemiptera from a temple pond in Cachar district, Assam . Hazarika and Goswami(2010) in their study in Gauhati university found 14 species comprising 12 genera and seven families under the order hemiptera. Hasan and Haloi(2016) also found same type of result in their study in guwahati. However, in West Bengal some researchers found insects of odonata and coleoptera to be the most common. In this investigation it was found that the number of species was recorded highest (15) followed by order coleopteran (4) .This is little information on the abundance and distribution of aquatic bugs in

freshwater bodies in kaliabor ; therefore it is necessary to make continuous studies so that they can be accessible for scientists who are interested in developing management plans to protect aquatic resources.

V. CONCLUSION

This study presents a first glimpse of aquatic insects of Kaliabor and it is done by taking only three water bodies but in Kaliabor large number of wetlands are available .So this study can not give the complete details of the diversity and distribution of aquatic insects available in this region so there is a need of much light in this area of research .This is a preliminary investigation but this study may open a new line which can be utilized by future researchers as baseline data for conservation of aquatic resources.

VI. REFERENCES

- [1]. Ahmed A, Ziauddin K. "Studies on the Ecology of aquatic Insects With special reference to fish Pond".1983,Ph. D. thesis Northeastern Hill University, Meghalaya, India.
- [2]. Barman ,A., Baruah, B.K. "Macrophyte preference and aquatic entomofaunal diversity of Kapla Beel, A fresh water wetland of Barpeta District of Assam, India." Asian journal of science and technology. 2015; 6(03):1205- 1210.
- [3]. Das K, Gupta S. "Aquatic Hemiptera Community of Agricultural Fields and Rain Pools in Cachar District, Assam, North East India, "Assam University Journal of Science & Technology: Biological and Environmental Sciences. 2010; 5(1):1.
- [4]. Das K, Gupta S. "Seasonal variation of Hemiptera community of a temple pond of Cachar District, Assam, Northeastern India". Journal of Threatened Taxa. 2012; 4:3050-3058. 23-128.
- [5]. Gogoi, A. Gupta, S. "Aquatic insect community of River Brahmaputra near Dibru Saikhowa National Park, Assam, North East India", Journal of

Entomology and Zoology Studies 2017; 5(2): 1257-1265.

- [6]. Hasan ,I. Haloi, D. Chetri, S. Begum, S "Biodiversity of aquatic insect population in three permanent ponds of Guwahati, Assam, India".International Journal of Fisheries and Aquatic Studies 2016; 4(6): 271-275.
- [7]. Hazarika ,R. Goswami, M.M. "Aquatic Hemiptera of Gauhati University", Journal of Threatened Taxa. 2010; 2:778-782.
- [8]. Martin Walters ,The Natural history of insects ,South water publishing ,2013, PP 80.
- [9]. Kumar, A., Kaur ,H.," Ecobiology of aquatic insects , South water publishing" ,2013, PP. 80.