Aquatic Hemiptera of Gauhati University, Guwahati, Assam, India

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Aquatic Hemiptera holds an important place in the ecology of freshwater ecosystem. They are important food for many organisms, including fish, amphibians, waterfowl and other animals (Clark 1992). They generally have an intermediate place in the food chain, for apart from being eaten, are often important predators too (Runck & Blinn 1994). Hemipterans are exceedingly important in relation to fish production. They are the primary food for many wild and cultivable fishes, which make them valuable for sport fisheries. On the other hand, these predators are also occasional pests in man-made nursery pond for fish culture where they feed on the young fish. Certain families of the bugs may be utilized in the biological control of mosquito larvae (Ohba & Nakasuji 2006; Saha et al. 2007).

A constituent of the Eastern Himalayan biodiversity hotspot, the state of Assam harbors a rich diversity of aquatic resources. In recent years, there have been a number of limnological investigations on the freshwater ecosystem of Assam but little work has been done on the description of aquatic Hemipteran population. Kalita (2008) recorded nine Hemipteran species from Deepar Beel, one of the Ramsar sites in Assam, while Chetri et al. (1997) reported seven species from the same wetland. Although Thirumalai (2002, 2007) mentioned the occurrence of 56 species under the Infraorder Nepomorpha (43 species, 17 genera, six families) and Gerromorpha (13 species, 11 genera, three families) from Assam, published literature on aquatic bugs is very scattered, particularly in pond ecosystem. This study is carried out to bridge the gap in contributing towards the knowledge of heteropteran population.

Study Area

The present work is based on the studies carried out for a period of one year, commencing from July, 2007 to June, 2008 in two pond ecosystems named as Pond A and Pond B (26^{0}09'26''N & 91^{0}40'21''E) of the Aquaculture and Biodiversity Campus of Zoology Department, Gauhati University, Guwahati, Assam, India (Figure 1, Image 1). Pond A is a manually managed pond, triangular in shape with a mean depth of 2.2m having an area of 1.4 hac. Pond B is a naturally maintained reclaimed swamp. The reclaimed zone is separated from the perennial swamp by a bamboo made screen (locally "*bana*"). Pond B is rectangular in size with a mean depth of 1m and having an area of 0.4 hac. In comparison with Pond A macrophytic growth is more in pond B. The ponds are rain fed and perennial. The bottom surface of Pond A comprises of loamy clay without any vegetation while in Pond B it consists of silt sediments intermingled with decaying vegetation.

Material and Methods

Circular 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. Collection of insects associated with macrophytes was done with a hand operated D-shaped dip-net with mesh size of approximately 500μm. Organisms were sorted and stored in 70% ethyl alcohol. Insects were identified to the lowest possible taxa using either a dissecting microscope or a compound microscope. Identification of a number of species was confirmed in the Central Entomological Laboratory of Zoological Survey of India, Kolkata. Aquatic taxonomic keys such as Pennak (1978), Bal & Basu (1994a, 1994b), and Thirumalai (2002, 2007) were used to identify the collected specimens. Identification was mainly based on the adults collected. Preservation was done by following both dry and wet methods of preservation and the paratypes were deposited in the Taxono-

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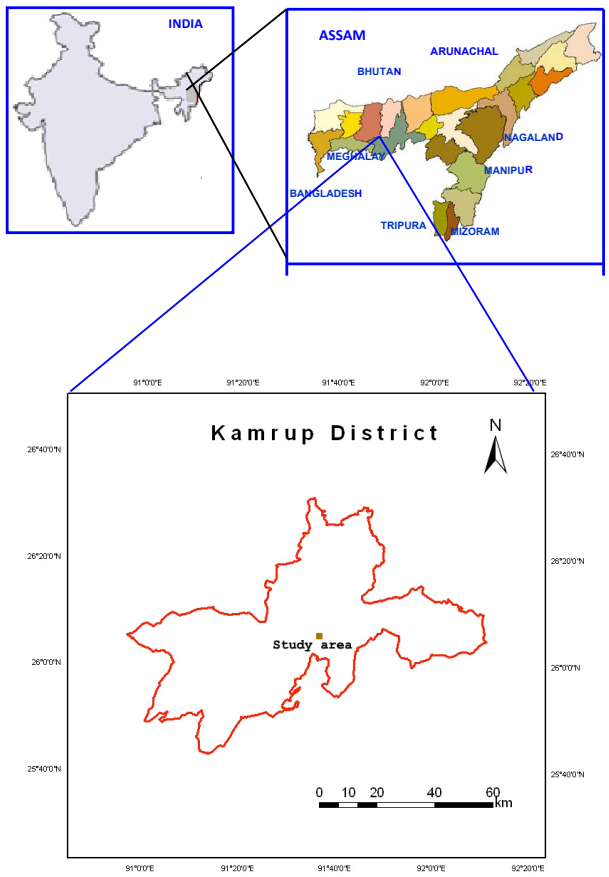

Figure 1. Location map of the study area

my and Biodiversity Study Laboratory of UGC-SAP (DRS) Project, Department of Zoology, Gauhati University.

Table 1. Aquatic Hemiptera collected at the two ponds in Guwahati University

Species	Ponds A	Ponds B
Hemiptera		
Corixidae		
Micronecta (Basilionecta) scuttellaris scuttellaris Stal (Image 4)	++	++
Notonectidae		
Nychia marshalli Scott (Image 5)	+	++
Pleidae		
Plea liturata Fiebr (Image 6)	+	+
Nepidae		
Laccotrephes griseus Guerin (Image 7)	-	+
Laccotrephes rubber Linnaeus (Image 8)	-	+
Ranatra filiformis Fabricius (Image 9)	+	++
Ranatra gracilis Dallas (Image 10)	-	R
Gerridae		
Neogerris parvula Stal (Image 11)	+	+
Gerris (Macrogerris) gracilicornis Horvath (Image 12)	+	+
Limnogonus nitidus Mayr (Image 13)	+	+
Belostomatidae		
Diplonychus rusticus Fabricius (Image 14)	+	++
Lethocerus indicus Lepeleiter & Serville (Image 15)	-	+
Mesovelidae		
Mesovelia vittigera Horvath (Image 16)	+	+
Hydrometridae		
Hydrometra greeni Kirkaldy (Image 17)	R	+

+ - Present/Common; ++ - Abundant; R - Uncommon; - - Absent

Results and Discussion

Altogether 14 species comprising 12 genera and seven families have been recorded in the present investigation; all belong to the suborder Heteroptera. Family Nepidae represents the highest number of species (four species) followed by Gerridae (three species) and Belostomatidae (two species). Families such as Corixidae, Notonectidae, Pleidae, Hydrometridae and Mesovelidae comprised one specie each. (Table 1). Pond B represents all the recorded species while only 10 species were recorded in Pond A. Habitat complexity in terms of presence or absence of littoral vegetation and hydromedian depth are found to be the most important factors affecting the distribution of aquatic hemiptera in the studied water bodies. Pond B representing intermediate conditions between swamp and open water is a herbaceous natural water body dominated by water hyacinth serves as a unique habitat for the colonization of rich and diverse species. In contrast, Pond A exhibits a different condition in terms of depth (mean depth 2.2m) and vegetation cover, without any dominant species of macrophytes during the study period.

The presently described species exceed the findings of Kalita (2008) and Chetri et al. (1997). Kalita (2008) recorded nine Hemipteran species including one species (*Rhopalosiphum nymphaeae* Linnaeus) belonging to Suborder Homoptera in Deepar Beel Ramsar site in Assam. The diversity of Hemipteran insects is also significantly high in comparison to some studies in freshwater wetland inhabiting insects of India. Deepa & Rao (2007) recorded eight heteropteran Hemiptera from Pocharam Lake, Andhra Pradesh; while, Bhattacharya (1998) described eight species in association with *Eichhornia crassipes* in some freshwater wetlands of West Bengal and Khan (2002) also recorded eight species from two man-made lakes of Kolkata. The number of recorded species in the present study signifies the rich diversity of the group in the freshwater ecosystems of Assam. There is little information on the abundance and distribution of aquatic bugs in freshwater bodies in Assam; therefore it is necessary to make continuous censuses so that they can be accessible for scientists who are interested in developing management plans to protect aquatic resources.

Image 1. Satellite image of the ponds in the Gauhati University campus

Images 2 & 3. Habitat shots. 2A & 2B - Pond A; 3A & 3B - Pond B.

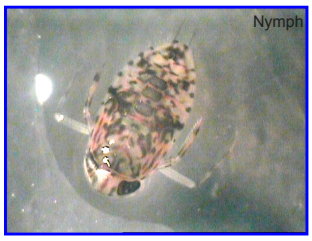

Image 4. *Micronecta* (Basilionecta) *scuttellaris scuttellaris* Stal

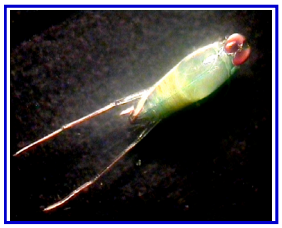

Image 5. *Nychia marshalli* Scott

Image 6. *Plea liturata* Fieber

Image 7. *Laccotrephes griseus* Guerin

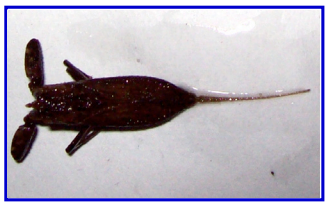

Image 8. *Laccotrephes rubber* Linnaeus

Image 9. *Ranatra filiformis* Fabricius

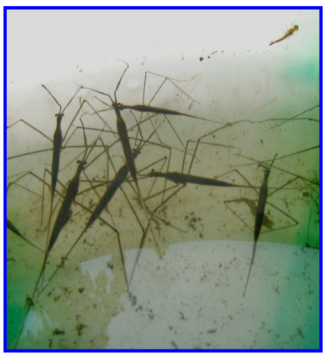

Image 10. *Ranatra gracilis* Dallas

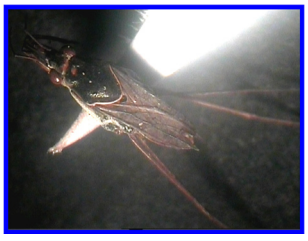

Image 11. *Neogerris parvula* Stal

Image 12. *Gerris (Macrogerris) gracilicornis* Horvath

Image 13. *Limnogonus nitidus* Mayr

Image 14. *Diplonychus rusticus* Fabricius (Male with eggs)

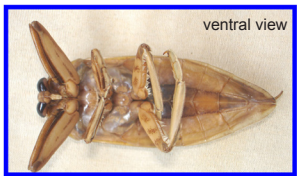

Image 15. *Lethocerus indicus* Lepeleiter and Serville

Image 16. *Mesovelia vittigera* Horvath

Image 17. *Hydrometra greeni* Kirkaldy

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