

Occurrence and Species Composition of Some Freshwater Insects in Min Hla Lake, Thazi Township, Mandalay Region

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Abstract

A total of 284 individuals, representing 14 species from 14 genera, ten families and three orders were recorded from Min Hla Lake, Thazi Township. The species of freshwater insects were identified Odonata (five species), Hemiptera (seven species), Coleoptera (two species). Out of these the most abundance freshwater insect species was Order Hemiptera and the least species number was observed in order Coleoptera. In Order Odonata, each of one species such as *Anax Junius* and *Ictinogomphus rapax* belonging to family Aeshnidae and Gomphidae were recorded respectively and three species such as *Orthetrum Sabina*, *Pantala flavescens* and *Trithemis auora* consist of family Libellulidae. In order Hemiptera, each of one species such as *Hydrometra martini*, *Gerris remigis*, *Notonecta glauca* composed in family Hydrometridae, Gerridae and Notonectidae respectively; two species such as *Nepa cinerea* and *Ranatra chinensis* were in Nepidae and two species such as *Lethocerus americanus* and *Diplonychus rusticus* were in Belostomatidae. In Order Coleoptera, *Dytiscus verticalis* (adult and larva) and *Hydrophilus triangularis* was found in the family Dytiscidae and Hydrophilidae respectively.

Keywords: Occurrence, Species Composition, freshwater insects, Min Hla Lake, Thazi Township

Introduction

There are about 751,000 known species of insects, which is about three-fourths of all species of animals on the planet. While most insects live in land, their diversity includes many species that are aquatic in habit (Majumder *et.al.*, 2013)

Aquatic insect exhibits the ability to use wide variety of food resources, exploit and develop them into a variety of macro and micro feeders that operate from deep within the substrata to the top of the surface film (Jenila and Nair, 2013).

Aquatic macro-invertebrates play an important role in maintaining healthy ecosystems. They consume algae and other organic matter which help to control nutrients and therefore influences water quality (e.g., eutrophication). They are a key component of the food web by providing a wide range of food sources for predators including larval and juvenile life stages of every fish species, small adult fish, as well as terrestrial animals like birds and bats. Macro-invertebrates are also useful indicators of water quality and the overall health ecosystems. Healthy aquatic ecosystems have both a greater diversity and higher densities of aquatic insects.

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Many aquatic insects play important roles in the aquatic and riparian food web, are good indicators of water quality because they live in environments that are cold and well-oxygenated (Wangchuk, and Eby, 2013).

The dragonfly larvae are an important part of the aquatic food webs involving invertebrates, fish and other aquatic vertebrates. They are top invertebrate predators in many freshwater habitats, preying upon a variety of organisms including diptera larva, ostracods, gastropods, smaller Odonata, and even small fish (Huggins, 1982) cited by Richardson, 2003.

Aquatic bugs (Hemiptera) are one of the prominent invertebrate groups in freshwater. Recognizing aquatic bugs has an important component of freshwater ecosystem. The aquatic and semi aquatic heteroptera referred as aquatic bugs one of the key predators of freshwater ecosystem and are very diverse (Kshirsagar, 2010).

Aquatic beetles were found in almost all aquatic systems but have rich diversity in the lentic habitat like wetland and ponds. Some species within the order Coleoptera were aquatic throughout their metamorphic stages from larvae to adult while in some cases the larval stages develop in aquatic systems while adults are terrestrial (Wangchuk and Eby, 2013).

In the study site (Min Hla Lake, Thazi Township), few studies have been undertaken on investigation and species composition of freshwater insect species. Therefore, this study site was selected to do research work. The objectives of this study were to record and identify the freshwater insect species, and to express the species composition of freshwater insect species from the study site at Min Hla Lake in Thazi Township.

Materials and Methods

Study Area

The specimens were collected from Min Hla Lake, Thazi Township. Min Hla Lake is located in Thazi Township Meiktila District and situated between latitudes $20^{\circ} 48' 05''$ - $20^{\circ} 51' 14''$ N and longitudes $92^{\circ} 02' 33.4''$ - $96^{\circ} 00' 51.24''$ E. The water body extended about 15608739.02 m^2 (1560.91 hectares or 3857 acres) (Figure 1).

Study Period

The study period lasted from October 2014 to February 2015.

Collection of Specimens

The collection was made early morning 6:00 to 9:00 am. The specimens were collected by

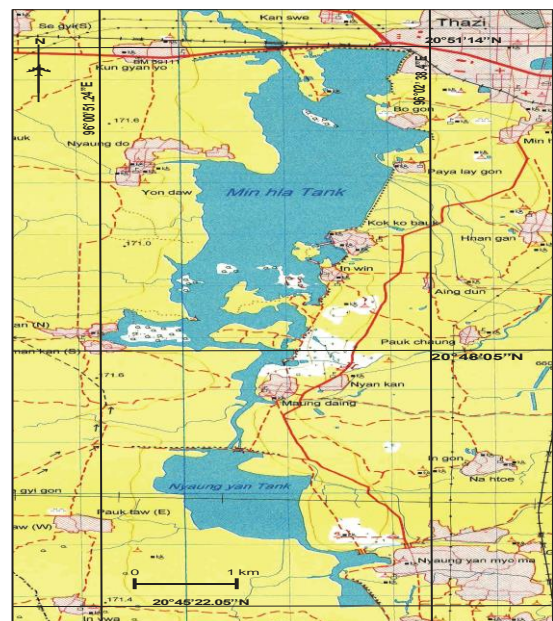


Figure 1 The map of Min Hla Lake, Thazi Township, Meiktila District

(Source: Department of Geography, Meiktila University)

hand picking in the fishing net and some species were collected by insect net (including a bottle on the top of net). The specimens were preserved in laboratory with formalin 10% concentration.

Identification of the Specimens

Specimens were identified in accordance with Pennak (1953), Borror, Triplehorn and Johnson (1989), Fonseca (2000), Gerber and Gabriel (2002), Subramanian and Sivaramakrishnan (2007), Theischinger (2009), Umar, Harding and Winterbourn (2013).

Results

This study period lasted from October 2014 to February 2015. The total number of 14 freshwater insect species (eight adult species and five larva species) from 14 genera and ten families belonging to three orders were recorded and identified (Table 1).

Occurrence and composition of insect species

A total of 284 individuals consist of 14 species belonging to 14 genera, ten families and three orders were recorded in the study area during October 2014 to February 2015 (Table 1).

Among the three orders, the order Hemiptera represented the highest composition of (seven species, 50%), followed by the order Odonata (five species, 35.71%), and Order Coleoptera (two species, 14.29%) (Table 3, Fig 2).

During the present study, the percentage species composition was the highest in Libellulidae (2.44%) with three species, followed by Aeshnidae, Gomphidae, Hydrometridae, Gerridae, Notonectidae, Dytiscidae and Hydrophilidae (7.14%) with one species each. Nepidae and Belostomatidae (14.29%) were two species each (Table 4, Fig 5).

Among the study months, the highest total number of 78 individuals and ten species were collected in January, followed by 76 individuals and ten species in December, 50 individuals and eight species in November, 42 individuals and nine species in February, 38 individuals and seven species in October (Table 2, Fig 3, 4).

Table. 1 Recorded freshwater insect species from Min Hla Lake, Thazi Township

Order	Family	Genus	Species	Common name
Odonata	Aeshnidae	<i>Anax</i>	<i>A. Junius</i> (Drury, 1773)	Common green darner
	Gomphidae	<i>Ictinogomphus</i>	<i>I. rapax</i> (Rambur, 1842)	Club tail dragonfly
	Libellulidae	<i>Orthetrum</i>	<i>O. sabina</i> (Drury, 1773)	Green skimmer
		<i>Pantala</i>	<i>P. flavescens</i> (Fabricius, 1798)	Glider
		<i>Trithemis</i>	<i>T. aurora</i> (Burmeister, 1839)	Crimson marsh skimmer
Hemiptera	Hydrometridae	<i>Hydrometra</i>	<i>H. martini</i> (Kirkaldy, 1900)	Water measure or Marsh treader

Table.1 Continued

	Gerridae	<i>Gerris</i>	<i>G. remigis</i> (Say,1832)	Water strider or Pond skater
	Notonectidae	<i>Notonecta</i>	<i>N. glauca</i> Linnaeus,1758	Backswimmer
	Nepidae	<i>Nepa</i>	<i>N. cinerea</i> Linnaeus,1758	Water scorpion
		<i>Ranatra</i>	<i>R. chinensis</i> Mayr,1865	Water stick insect
	Belostomatidae	<i>Diplonychus</i>	<i>D.rusticus</i> Fabricius,1871	Little water bug
		<i>Lethocerus</i>	<i>L. americanus</i> (Leidy, 1847)	Giant water bug
Coleoptera	Dytiscidae	<i>Dytiscus</i>	<i>D. verticalis</i> (larva & adult) Say, 1823	Predaceous diving beetle
	Hydrophilidae	<i>Hydrophilus</i>	<i>H. triangularis</i> Say, 1823	Water scavenger beetle

Table 2 Monthly occurrence of freshwater insect species in Min Hla Lake, Thazi Township

No	Species	Oct.	Nov.	Dec.	Jan.	Feb	Total
1	<i>Anax Junius</i>	0	0	1	2	0	3
2	<i>Ictinogomphus rapax</i>	0	1	0	0	1	2
3	<i>Orthetrum sabina</i>	2	0	0	1	0	3
4	<i>Pantala Flavescens</i>	3	10	6	1	2	22
5	<i>Trithemis aurora</i>	2	5	4	6	3	20
6	<i>Hydrometra martini</i>	0	0	0	1	0	1
7	<i>Gerris remigis</i>	0	0	2	0	4	6
8	<i>Notonecta glauca</i>	5	3	7	8	2	25
9	<i>Nepa cinerea</i>	1	1	2	8	3	15
10	<i>Ranatra chinensis</i>	20	15	40	20	10	105
11	<i>Diplonychus rusticus</i>	0	5	2	0	10	17
12	<i>Lethocerus americanus</i>	0	0	0	1	0	1
13	<i>Dytiscus verticalis</i>	5	10	11	30	7	63
14	<i>Hydrophilus triangularis</i>	0	0	1	0	0	1
Total		38	50	76	78	42	284

Table 3 Species Composition of different Orders in Min Hla Lake, Thazi Township

No	Order	Family	Genus	Species	Composition %
1	Odonata	3	5	5	35.71
2	Hemiptera	5	7	7	50
3	Coleoptera	2	2	2	14.29
Total		10	14	14	100

Table 4 Percentage of recorded families from Min Hla Lake, Thazi Township, during October 2014 to February 2015

No.	Family	Genus	Species	Composition%
1	Aeshnidae	1	1	7.14
2.	Gomphidae	1	1	7.14
3.	Libellulidae	3	3	21.44
4.	Hydrometridae	1	1	7.14
5.	Gerridae	1	1	7.14
6.	Notonectidae	1	1	7.14
7.	Nepidae	2	2	14.29
8.	Belostomatidae	2	2	14.29
9.	Dytiscidae	1	1	7.14
10.	Hydrophilidae	1	1	7.14
Total		14	14	100

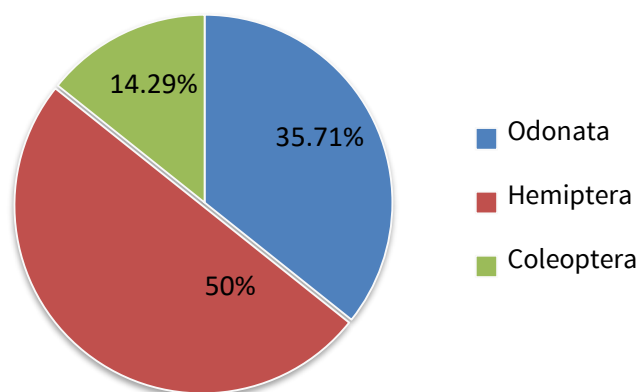


Figure 2. Species Composition of different Orders in Min Hla Lake, Thazi Township.

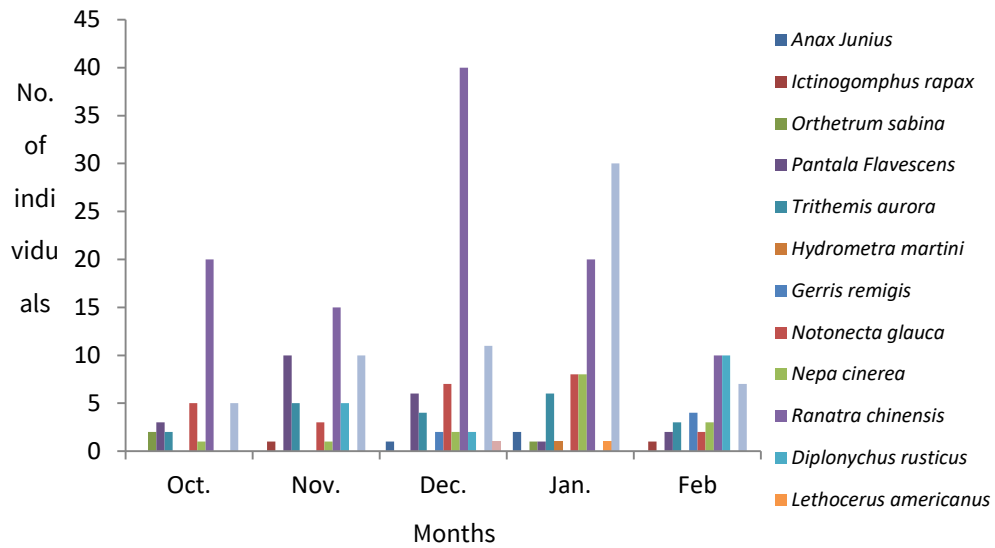


Figure 3. Monthly occurrence freshwater insect species in Min Hla Lake, Thazi Township

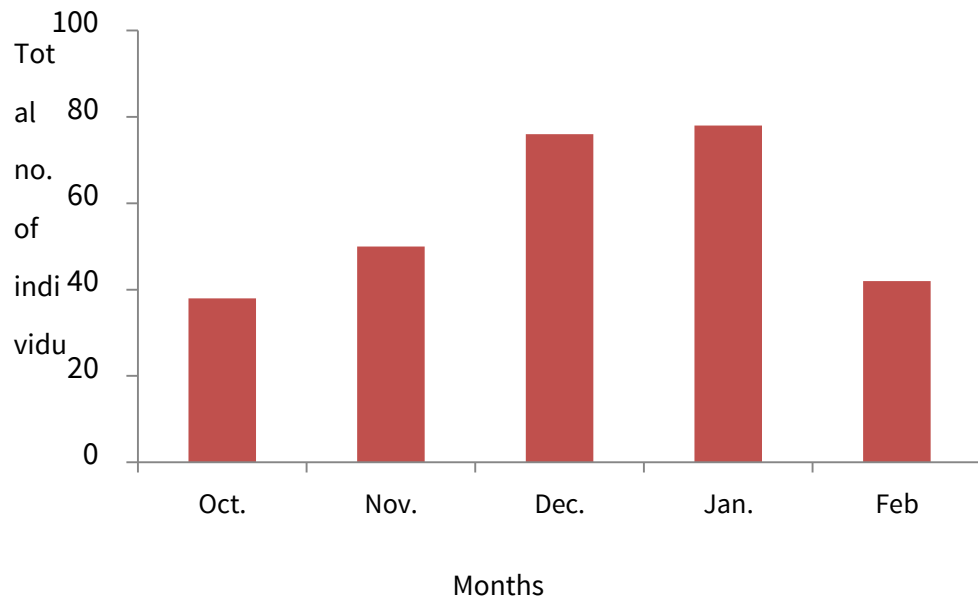


Figure 4. Monthly occurrence and total number of freshwater insect species in Min Hla Lake, Thazi Township

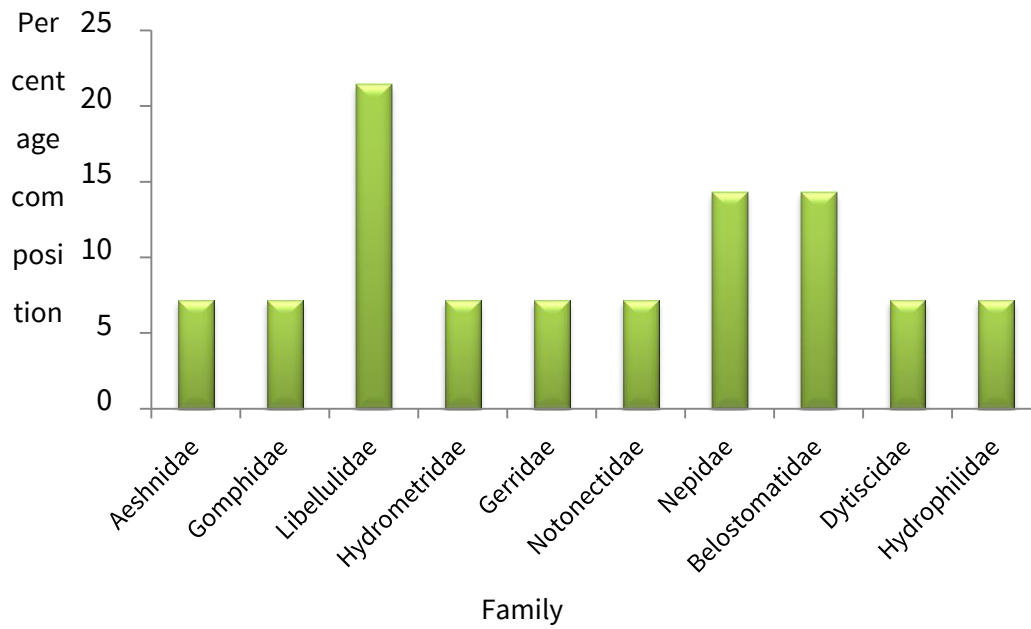


Figure 5. Percentage of recorded families from Min Hla Lake, Thazi Township, during October 2014 to February 2015



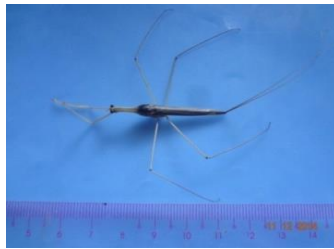
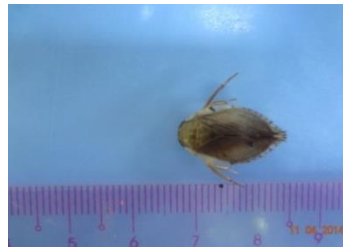
*J. Ranatra chinensis**K. Diplonychus rusticus**L. Lethocerus americanus**M. Dytiscus verticalis* (larva)*N. Dytiscus verticalis* (adult)*O. Hydrophilus triangularis*

Plate 1 Recorded freshwater insects species

Discussion

In the present study a total of 14 species of insects were collected and identified. The occurrence of 14 species was recorded from the study site during October 2014 to February 2015.

Majumder *et al.*, (2013) recorded that 15 families in four orders and founded eight species of family Libellulidae, six species of Dytiscidae, two species of Hydrophilidae, each species of Gerridae, Hydrometridae and Notonectidae, three species of Nepidae, and two species of Belostomatidae of aquatic insects respectively in urban freshwater lakes of Tripura, Northeast India.

In this work, 10 families in three orders and founded 14 species of aquatic insect are found in the study site, in which three species of family Libellulidae, two species of family Nepidae and Belostomatidae, each of one species in family Aeshnidae, Gomphidae, Hydrometridae, Gerridae, Dytiscidae and Hydrophilida. The recorded individual numbers of *Orthetrum Sabina*, *Pantala flavescens* and *Trithemis aurora* in family Libellulidae are also abundant. So, this finding agreed with the finding of Majumder *et al.*, (2013).

Benthic insect is most dominating in winter season because during winter season the predation pressure is low as well as, the capacity of water to holding oxygen is high which makes suitable condition for benthic insects as a result of which the density is high (Kabir, Parveen, Uzma and Hltaf, 2013). In the present study, the highest individual numbers were recorded during the winter month of November, December and January. This finding coincided with that of Kabir *et.al.*, (2013).

In the present study, the highest species number was recorded in December and January because freshwater body of study area reduced in these months.

Odonata larvae occupy a great diversity of aquatic habitats although in general they are most abundance in lowland streams and ponds. Odonata larvae have become specialized that

different species can occupy a wide range of habitats, and a diversity of macro-habitats, within a single body of water (Richardson, 2003). In this work, order Odonata larvae have been studied 50 individuals, five species belonging to five genera and three families. In Min Hla Lake, there were various habitat types such as pool, pond, water outlets and swamp. Thus, it contrasted with the finding of Richardson (2003).

Water bugs (Hemiptera) are effective predators of varied aquatic organisms. Their role in nature may be both beneficial as well as harmful. They are beneficial in preying upon the larvae of noxious insect like mosquitoes, gnats, midges, etc., which are responsible for various kinds of human-diseases (Sharma and Agrawal, 2012). As order Hemiptera, the present study worked out seven species belonging to seven genera, five families. The family Hydrometridae (*Hydrometra martini*), Gerridae (*Gerris remigis*), Notonectidae (*Notonecta glauca*), Nepidae (*Nepa cinerea* and *Ranatra chinensis*), and Belostomatidae (*Diplonychus rusticus* and *Lethocerus americanus*) were the order Hemiptera. This order was highest species number in this study. So, they may be benefic for human being because they prevented the harmful insects by preying the larvae of mosquitoes, gnats and midges.

In order Coleoptera (beetle), the present study worked out two families (14.29%); they were the Dytiscidae and Hydrophilidae. In this order, the individual number of Dytiscidae (*Dytiscus verticalis*) was more abundant than that of Hydrophilidae (*Hydrophilus triangularis*). *Dytiscus verticalis* most occurred in January because water body of lake is less than other months.

Therefore, Aquatic insects are a sign of a healthy aquatic ecosystem; therefore, sampling aquatic macro-invertebrates is a necessity when determining the health of a stream (Basin and Denham, 2011). Thus the finding of aquatic insects in Min Hla Lake indicated the health of aquatic ecosystem of lake. Therefore, Min Hla Lake in Thazi Township can be considered as aquatic ecosystem good health and abundance of aquatic insect species. Freshwater insect species indicate freshwater aquatic ecosystem and good aquatic habitat. Those freshwater insects were not only helpful to aquatic birds, fishes, and other aquatic vertebrates, supported the food chain of aquatic habitats but also provided the habitats of aquatic larva stages of dragonfly. The present study may be beneficial for Min Hla Lake and this environment.

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