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A primary check list of Entomofauna around Lake Siliserh in Alwar district, Rajasthan, India

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Abstract
Siliserh (Siliser) Lake is a scenic man-made reservoir situated in the Aravalli hills near Sariska Tiger Reserve. It is also recognized as a Ramsar site to protect the significant biodiversity and rare habitats. Aquatic insects are valuable as bio indicators of both the health and quality of freshwater systems because of their diversity, high reproduction rates, short generation periods, and rapid colonization. In the field research survey total 285 specimens of entomofauna of 17 species from 10 families were collected. Order coleoptera was observed maximum abundant followed by Order Lepidoptera, Orthoptera, Hemiptera and Neuroptera. Maximum species richness was observed from three families Scarabidae (3 species Order-Coleoptera), Dytiscidae (3 species Order-Coleoptera), Pentatomidae (3 species Order-Hemiptera), followed by Erabidae (02 species), single species from Family Gryllidae (Order- Orthoptera), Ascalaphidae (Order- Neuroptera), Hydrometridae (Order-Hemiptera), Crambidae, Geomatridae and Noctuidae (Order- Lepidoptera). *Digitonthophagus gazelle* and *Acheta domesticus* were the abundance species with maximum relative abundance of 16.84% and 16.49% respectively.

Keywords: Entomofauna, siliserh lake, relative abundance

Introduction

India, with 2 percent of global space, is one of the 17 mega diversity nations in the world in terms of insect diversity with a very rich and diverse insect fauna. About 66,363 species of insects have been known from India, representing about 6.29 percent of the world insect fauna. Insects are the most ubiquitous, successful and dominant forms in the whole of animal kingdom and are remarkably adaptable to a variety of environments**.** The number of actually described insects in the world stands at 9,65,431–10,15,897 (Banerjee *et al*. 2022). The total endemic species of insects in India is 20,765. A review study revealed that there were 878 insect species and subspecies recorded belonging to 104 families and 14 orders in Rajasthan. Among all, the order Lepidoptera is most diverse representing 234 species followed by Hymenoptera with 208 species and Coleoptera with 129 species (Prajapati and Meena 2021) [1]. Diptera, Coleoptera and Trichoptera are the major representatives of freshwater insects with 43%, 18% and 15%, respectively, of the total of almost 76,000 freshwater insect species. These numbers include some families of Diptera, such as Tabinidae, which are not addressed in specific chapters and whose diversity is estimated at around 5,000 species. Other important taxa are Heteroptera (6%), Plecoptera (5%), Odonata (7%) and Ephemeroptera (4%) **(** Balian *et al*. 2008) [3]. A field survey was conducted to assess the insect diversity around the wet lands of upper-northern Rajasthan. Through systematic field studies and taxonomic analysis, this research paper explores the richness and distribution of insects' population, wetland represents the highest insect biodiversity (Kaur and Singh, 2023) [6].

Bio-monitoring of aquatic insects and their varying responses to stimuli in their aquatic habitat helps assess the quality of the environment (Majumder *et al.*2013) [7].Human activities affect biodiversity the most. Due to human activities, habitats of wildlife are getting destroyed, which is the main reason for reduction in biodiversity. Insects, the largest group of the animal kingdom, are most affected by human activities (Vaz *et al*. 2023) [11]. Increasing urbanization, there was a significant decrease in the abundance, species richness and biomass of insects. This decrease was found to be up to 61% in the species richness of insects and up to 93% in biomass (Svenningsen et. al. 2024) [10]. Aquatic insects are valuable as bio indicators of both the health and quality of freshwater systems because of their diversity, high reproduction rates, short generation periods, and rapid colonization (Choudhary and Ahi, 2015a). In India, status of the aquatic entomofauna were Order Coleoptera consists of 137 species, Order Hemiptera was represented by 126 species, order Ephemeroptera fauna is represented by 54, 28 species of Order Diptera Order Trichoptera was represented by 18 species (Anamica *et al*. 2021) [2]. Relative species abundance is a component of biodiversity and is a measure of how common or rare a species is relative to other species in a defined location or community (Hubbell S P. 2001). The present study was conducted to access entomofaunal diversity around siliserh lake of Alwar district in Rajasthan, India.

Materials and Methods

Various insect traps like Melaise trap, pitfall trap, dish trap, rearing trap, light trap, Wilkinson trap, light sheet, Manitoba trap is used to collect insects. Liquid killing agents (70%-90% ethanol, isopropanol) and preservative (ethanol-glycerin- acetic acid solution, formalin-acetic acid-dioxin solution and kerosene-acetic acid-dioxin solution) is useful.
Correct method for the use of spreading board for stretching of samples and proper caring method for mounting, labelling, barcoding, transporting and microscopic investigation method for insect samples is also important (Schauff 1986) [9]. The surveys were carried out at around Siliserh Lake at Alwar district, between the periods of

August, 2022 to March, 2023. Sweep net used for the collection of entomofauna. The survey was done once in a week at the sites and ethyl acetate was used as killing agent for trapped entomofauna. Then collected entomofauna were pinned by using entomological pins and kept in the insect box for identification. All collected specimens were well labelled and preserved in airtight insect boxes. Relative species abundance was also measured. The some specimens were primarily identified by ICAR New Delhi.

Result and Discussion

Siliserh Lake is a scenic man-made reservoir situated in the Aravalli hills near Sariska Tiger Researve. It is also recognized as a Ramsar site to protect with significant biodiversity and rare habitats. In the field research survey total 285 specimens of entomofauna of 17 species from 10 families were collected from August, 2022 to March, 2023. Order coleoptera was observed maximum abundant followed by Order Lepidoptera, Orthoptera, Hemiptera and Neuroptera. Maximum species richness was observed from three families Scarabidae (3 species Order-Coleoptera), Dytiscidae (3 species Order-Coleoptera), Pentatomidae (3 species Order-Hemiptera), followed by Erabidae (02 species), single species from Family Gryllidae (Order-Orthoptera), Ascalaphidae (Order- Neuroptera), Hydrometridae (Order-Hemiptera), Crambidae, Geomatridae and Noctuidae (Order- Lepidoptera). *Digitonthophagus gazelle* and *Acheta domesticus* were the abundance species with maximum relative abundance of 16.84% and 16.49% respectively (Table-1). *Sandracottus dejeani* (Order- Coleoptera) and *Halyomorpha picus* (Order-Hemiptera) were the least abundant species with relative abundance 1.05% and 1.40%.

Table 1: Entomofauna of Lake Siliserh with their relative abundance

ORDER- COLEOPTERA			Total Numbers	Relative Abundance (%)
SL.NO.	NAME OF FAMILY	NAME OF SPECIES		
1	Dytiscidae	*Cybister tripunctatus asiaticus (Sharp, 1882)*	18	6.31
2		*Eretes sticticus (Linnaeus, 1767)*	38	13.33
3		*Sandracottus dejeani (Aube, 1838)*	3	1.05
4	Scarabaeidae	*Anomala bengalensis (Blanchard, 1851)*	17	5.96
5		*Anomala rugosa (Arrow, 1899)*	18	6.31
6		*Digitonthophagus gazella (Fabricius, 1787)*	48	16.84
ORDER- ORTHOPTERA				
7	Gryllidae	*Acheta domesticus (Linnaeus, 1758)*	47	16.49
ORDER- NEUROPTERA				
8	Ascalaphidae	*Ululodes quadripunctatus (Burmeister, 1839)*	5	1.75
ORDER- HEMIPTERA				
9	Hydrometridae	*Hydrometra sp.*	8	2.8
10	Pentatomidae	*Halyomorpha picus (Fabricius, 1794)*	4	1.4
11		*Nezara viridula (Linnaeus, 1758)*	14	4.91
12		*Pentatoma sp.*	5	1.75
ORDER- LEPIDOPTERA				
13	Crambidae	*Spoladea recurvalis (Fabricius, 1775)*	12	4.21
14	Erabidae	*Utetheisa lotrix (Cremer, 1779)*	16	5.61
15		*Aloa lactinea (cremer, 1777)*	9	3.15
16	Geometridae	*Isturgia disputaria (Guenee, 1858)*	15	5.26
17	Noctuidae	*Olepa ricini*	8	2.8
Total			285	100

Conclusion

In the field research survey total 285 specimens of entomofauna of 17 species from 10 families were collected from August, 2022 to March, 2023. The maximum abundance of insects observed was of order Coleoptera followed by Order Lepidoptera, Orthoptera, Hemiptera and Neuroptera. Maximum species richness was observed from three families Scarabidae (3 species Order-Coleoptera), Dytiscidae (3 species Order-Coleoptera), Pentatomidae (3 species Order-Hemiptera), followed by Erabidae (02 species), single species from Family Gryllidae (Order-Orthoptera), Ascalaphidae (Order- Neuroptera), Hydrometridae (Order-Hemiptera), Crambidae, Geomatridae and Noctuidae (Order- Lepidoptera). Entomologists reported the aquatic entomofauna diversity in their survey area which enables us to understand their significance of entomofauna at each trophic level of ecosystems. Consequently, an ecological study of aquatic insects can provide information about the ecology of insects in a specific area, which can be used as baseline data for future research and conservation planning.

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Conflict of Interest: No conflict of interest between the authors's.

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