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A STUDY OF ODONATE BIODIVERSITY IN AND AROUND BHENSODA POND

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Abstract

A study was carried out near and around Bhensoda pond near Bhensoda Village of Bhanpura tehsil of Mandsaus district, a total no of 20 species of 12 genera and 4 families of odonata were recorded in which 17 species 10 genera belong to sub order Anisoptera (dragonflies). While 3 species of 2 genera belongs to suborder Zygoptera (damselflies). Libellulidae was the most dominant family with 14 species while from Gomphidae was the rarest family with 1 species.

Keywords: *Biodiversity, Bhensoda Pond, Species, Damselflies, Ecosystem.*

Introduction

Odonata is one of the most ancient groups of insects which first appeared during the Carboniferous era, about 250 million years ago. (Subramanian K.A., et al., (2005)), Dragonfly (Suborder Anisoptera) and Damselflies (Suborder Zygoptera) both belongs to order Odonata. Globally approximately 6000 species (5,952) of Odonates that belonged to 652 genera have been reported (Schorn, M. and Paulson, D., 2013). India harbours 474 species and so subspecies belonging to 142 genera in 18 families (Subramanian K.A. 2014). The Odonates are amphibiotic insects which spend a major part of their life cycle in a fresh water ecosystem. They are flagship Insects communities which indirectly influence the tropic level balance of the lake ecosystem. The presence of dragonflies is an important indicator for ecological balance. By the way of reproduction, these insects lay their eggs in on or near any fresh water (Corbet, 1993) and thus, their high abundance in an area is a good indication of the quality of fresh water. Perhaps there is a connection between characters of water that influences particular groups of anisopterans to choose the specific environment for their survival. The factors that mainly influence dragonflies and damselflies diversity and assemblage composition are habitat structure and complexity, predation, pollution and water chemistry (Schridde, P. et al 1994). Odonates larval and adult stage play a significant role as a predator in the wetland ecosystem as a biological agent. Odonates also act as a biological agent four many disease-causing species including mosquitoes. Odonata are used as bio-indicators for wetland quality in Europe, Japan, USA, Australia (Clausnitzer and Jodicke, 2004) and in South Africa (Clark and Samways 1, 1996; Stewart and Samways, 1998). The greatest number of species are found on sites that offer a wide variety of micro-habitats, though dragonflies tend to be much more sensitive to pollution than damselflies (Ameilia et al 2006).

Wetlands are characteristic larval habitat of different insect groups adapted to completion of the life cycle either in part or in full aquatic or semi aquatic condition. The survey of Odonata Communities can be considered as essential tool for characterizing and assessing the habitat heterogenicity and hydrological features of the wetland.

The aquatic environment with its water quality is considered to be the main factor controlling the state of health and disease of aquatic organisms.

The present research work is aimed at documentation of Odonate biodiversity in and around Bhensoda pond.

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Materials and Methods

Field survey method was adopted while many other sampling methods were also available for survey like transect surveys, visual surveys, netting etc. Here the netting method was used for survey in which nets were used to catch Odonates for species identification and further analysis. This field survey was conducted from in and around the habitats.

The methodology of Boudot al. 2016 away followed for surveys and preservation of specimens. Species were identified with the help of field guides of Mitra, 2002; 2005. Andrew et al, 2008.

Four collection of insects netting method are adopted. Odonate activity varies throughout the day and across seasons, so multiple surveys at different times and seasons have been carried out and these were conducted in warm season to rainy season where maximum, activity captured. Survey was conducted during morning till noon.

It was important that only adult Odonates were collected, Photographed, identified and released.

All species of different Odonates with their families which were observed during surveys were documented. Ethical treatment of Odonates during surveys, including proper handling and release procedures for captured individuals was ensured under the guidance of experts.

A pilot survey was also conducted in each area to refine methodologies. Standardizing survey protocols were also followed to minimize errors and biases.

Review of Literature

Chandra et al (2007) prepared a check list of butterflies of Madhya Pradesh and Chhattisgarh states representing 174 species/ sub species of 100 genera under 8 families and presented a paper titled “A checklist of butterflies of Madhya Pradesh and Chhattisgarh States, India”.

Tiple and Chandra (2013) presented a paper titled “Dragonflies and Damselflies (Insecta, Odonata) of Madhya Pradesh and Chhattisgarh States, India” in which they prepared a check list of 106 species of Odonates belonging to 53 genera representing 12 families of which 14 species were new records. Libellulidae family was found the most dominating family followed by Coenagrionidae, Gomphidae, Protoneuridae, Hestidae, Calopterygidae, Aeshnidae, Chlorocyphidae, Platycnemididae, Macromiidae, Euphaeidae, Corduliidae respectively.

Basumatary et al (2014) presented a paper titled “A preliminary study on the diversity of odonata in Bodoland University and its vicinity, Assam, India”. In this paper they described, finding of 34 species of Odonates, including 26 species of dragonflies belonging to 3 families and 8 species of damselflies from May 2013 to November 2014.

Bhandari et al (2015) presented a paper titled “Diversity and Abundance of Odonata in Catchments of Ban Sagar Dam, Shahdol (M.P.)”, In which they conducted an Odonates survey on downstream of some river in the surrounding of Ban Sagar dam in M.P. from December 2014 to November 2015.

Koli et al (2015) presented a paper titled “Diversity and Species Composition of Odonates in Southern Rajasthan, India”, in which a study in South Rajasthan to explore diversity and species composition of Odonates from January to June 2013 was conducted. Total 1290 individuals from 8 families and 54 species were recorded in which 4 families and 28 species were belongs to Anisoptera while 4 families and 26 species belonged to Zygoptera.

Tiple and Koparde (2015) presented a paper titled “Odonata of Maharashtra, India with Notes on Species Distribution” in which they conducted Odonates surveys in Maharashtra during 2006-2014. 134 species of 70 genera representing 11 families were recorded.

Bried et al (2015) presented a article titled “A review of odontology in freshwater applied ecology and conservation science” in which they presented a review of odontology in fresh water applied ecology and conservation science.

Varshini and Kanagappan (2016) presented a article titled “A Study on the diversity of Odonate Larvae in a Permanent Pond Melpalai at Melpuram in Kanyakumari district, Tamilnadu, India”, in which the habitat diversity of Odonate larvae occurring in a permanent pond melpalai in Melpuram, Kanyakumari Dist. (Tamil Nadu), was studied during August 2013 to July 2014, 21 species of Odonates were recorded in which Libellulidae family dominated all the other families.

Dey et al (2017) presented a article in E. planet journal titled “A Study on Butterfly diversity in Singur, West Bengal, India”, in which they conducted a study on butterfly diversity in Singur, West

Bengal, India from March, 2015 to November, 2016. A total of 69 species belonging to 54 genera and 5 families were recorded in which Nymphalidae was the most dominant family followed by Lycaenidae, Hesperidae, Pieridae, Papillionidae respectively.

Miguel et al (2017) presented a paper titled "A scient metric study of the order Odonata with special attention to Brazil", in which they identified the principal trends and gaps in the database on these organisms.

Patil et al (2018) presented a paper titled "Diversity of Odonata (Dragon flies and Damsel flies) Fauna of Khanapur Tehsil, Dist. Sangli (M.S.) India", in which a study of diversity of Odonates of Khanapur Tehsil, Dist. Sagli (M.S.) India from January 2016 to February 2018 was conducted and 719 individuals of Odonates belonging to 06 families, 23 genera and 34 species were recorded during this study period. Coenagrionidae was found the most dominant family.

Shakur (2018) presented a paper titled "An Annotated Checklist of Odonate Fauna From Southern Marwar Region of Rajasthan (INDIA)", in which prepared a check list of Odonate fauna from Southern Marwar region of Rajasthan (India).14 species of dragonflies and 5 species of damselflies were recorded.

Abdullahi et al (2019) presented a paper titled "A Study on Butterfly Diversity in Prayagraj District of Uttar Pradesh, India", in which a study on butterfly in Prayagraj district of Uttar Pradesh, India was conducted a total of 316 individuals and 21 species of butterfly belong to 4 families were recorded during the study period. Nymphalidae was the richest family that comprised 43% of the total species of butterflies recorded in the study area followed by Pieridae (29%) and Papillionidae (14%).

Bishnoi and Dang (2019) presented a article in Journal of Entomology and Zoology titled "Diversity of some Odonatans insects in Kota, Rajasthan, India", in which they conducted a study on Odonate insects from September 2014 to August 2016 in Kota, Rajasthan. 12 species of 2 families were found in which 2 species were rare in the study site.

Johari and Jain (2020) presented a article titled "Seasonal Variation of Odonate Diversity in Abheda Mahal, Kota, Rajasthan, India", in which they conducted a study of seasonal variation and diversity of Odonates at Abheda Mahal Kota, Rajasthan, India in 2018-2019. In their study a total number of 8 species of 2 families were found in which 5 species were of dragonflies while 3 species were damselflies.

Chandran and Jose (2021) presented a paper titled "A preliminary study of Odonates diversity in Mundakkottu kurussi, Palakkad, Kerala", in which they conducted a study to explore diversity and threats of Odonates in Mundakkottu kurussi, Palakkad district, Kerala, during August 2020 to November 2020. Total 21 species of 16 genera and 5 families were recorded.

Haneef et al (2021) presented a paper titled "Report of Bradinopyga konkanensis Joshi & Sawant, 2020 (Insecta: Odonata) from Kerala, India", in which they reported a newly described dragonfly species Bradino Pyga Kankanensis Joshi and Sawant 2020 from Kerala. It was found 450 km away from its nearest record.

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Salsabiela et al (2021) presented a paper titled "Effect of Altitude on Odonata Biodiversity in the Paddy Field of Sleman Regency, Special Region of Yogyakarta", in which the effect of altitude on the diversity of Odonata in paddy field ecosystem in Sleman Regency, Special Region of Yogyakarta was analysed.

Aghade et al (2022) presented a review titled "A review on Odonate diversity and habitat in India", in which they focused on Odonate diversity and habitat in India. A few specific dragonfly species and studies on dragonflies were found that are related to diversity and habitat.

Sadasivan et al (2022) presented a paper titled "The dragonflies and damselflies (Insecta: Odonata) of Shendurney Wildlife Sanctuary, southern Western Ghats, India", in which Odonate diversity of Shendurney Wildlife Sanctuary, southern Western Ghats of Kerala state was studied. Total of 181 species of 87 genera and 14 families have been compiled for Kerala. 11 species were found very common, 42 common, 34 not rare, 10 rare, 19 species were very rare inside the sanctuary.

Cadena et al (2023) presented a paper titled “Impacts of climate change on dragonflies and damselflies in West and Central Asia”, in which the impact of climate change on dragonfly and damselfly in West and Central Asia was studied by them.

Paray and Mir (2023) presented a report titled “Odonate fauna (Insecta: Odonata) of Kashmir, Jammu & Kashmir, India: a preliminary report”, in which they conducted a study to investigate the variety of Odonates in Kashmir from November 2020 to November 2022. 24 species were revealed in which 18 of Anisoptera and 6 were of Zygoptera.

Result and Discussion

The biodiversity survey of Odonates carried out between April 2023 to September 2024 in different areas around the Bhensoda pond. During the present study a total of 20 species of 4 families of Odonates were recorded.

Libellulidae was the most dominant family with 14 species followed by Aeshnidae Coenagnioni-3 species, Aeshnidae 2 species and Gomphidae 1 species.

The maximum no. of species was recorded 14 sp. with 97 individual belongs to Libellulidae family while 21 individuals of Cornay-nonidea family (3 species), 8 individuals of Aestinidae. (2 species) and 3 individuals of Gomphidae family (1 species) respectively.

Anisoptera belongs to dragonflies and Zygoptera belongs to damselflies. Results shows That Anisoptera order is the most dominant with 17 species and 10 genera while Zygoptera is represented by only 3 species of 2 different genera.

This survey shows that Bhensoda pond having rich diversity of Odonates. In which 20 species of 4 different families have been found, Libellulidae family showed dominance with maximum 14 species followed Aeshnidae (2 species) and Gomphidae (1 species) in order Anisoptera which belongs to dragonflies while in order Zygoptera (damselflies) only 3 species were found which belongs to 2 different genera.

This survey has been done first time at this region which shows rich diversity of Odonata. A good no. of Odonates sp. also indicate good water quality and less polluted water which is also a good sign at present scenario.

Results also shows that no. of Odonates species gradually increases with improvement of water quality from bad to medium and good. Area around the pond having disturbances and some anthropological activities show less species no. and diversity while undisturbed area shows species richness. further detailed study is recommended for more results.

Table 1: Dragonflies Species Recorded from Bhensoda Pond

Sr. No.	Family	Scientific Name	Common Name
1.	Aeshnidae	*Anax ephippigen*	Vagrant emperor
2.	Aeshnidae	*Anax immaculifrons*	Blue darner
3.	Libellulidae	*Brachythemis contaminata*	Ditch jewel
4.	Libellulidae	*Bradinopyaga geminata*	Granite ghost
5.	Libellulidae	*Crocothemis erythraea*	Common scarlet darter
6.	Libellulidae	*Crocothemis servilia*	Ruddy marsh skimmer
7.	Libellulidae	*Diplocodes trivialis*	
8.	Libellulidae	*Diplocodes lefebvrii*	Black ground skimmer
9.	Libellulidae	*Ictinogomphus rapax*	Indian common club tail
10.	Gomphidae	*Orthetrum cancellatum*	
11.	Libellulidae	*Orthetrum glaucum*	
12.	Libellulidae	*Orthetrum sabina*	
13.	Libellulidae	*Trithemis aurora*	Crimson marsh glider
14.	Libellulidae	*Trithemis pallidinenuis*	Long legged marsh glider
15.	Libellulidae	*Rhyothemis variegata*	Common picture wing
16.	Libellulidae	*Rhodothemis rufa*	Rufous marsh glider
17.	Libellulidae	*Acisoma panorpoides*	Trumpet tail

Table 2: List of Damselflies (Zygoptera) Recorded from Bhensoda Pond

Sr. No.	Family	Scientific Name	Common Name
1.	Coenagrionidae	*Agriocnemis pygmaea*	Pygmy dartlet
2.	Coenagrionidae	*Ischnura rubilio*	Golden dartlet
3.	Coenagrionidae	*Ischnura senegalensis*	Senegal golden bluetail

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