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RESEARCH ARTICLE

DIVERSITY AND ABUNDANCE OF ODONATA IN CATCHMENTS OF BANSAGAR DAM, SHAHDOL (M.P)

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ABSTRACT

An Odonata survey on downstream of Sone River was conducted in the surrounding of Bansagar dam in Madhya Pradesh from December, 2014 to November, 2015. The purpose of this one year investigation was to provide information on the diversity and abundance of Odonata. The study revealed that in catchments of river Sone, 22 species of 6 families under 2 sub orders of Odonata were encountered where family *Libellulidae* was the most diverse with 10 species in contrast to local reference sites of river. The increase of Odonata in the surrounding of river throughout the study period was best highlighted by the presence of biological pollution indicator species.

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INTRODUCTION

The Odonata is a well-studied order worldwide. However, modern families of these insects date from the upper Jurassic and Cretaceous periods (150-60 million years ago) (Westfall and May, 1996). Dragonflies and damselflies are among the most attractive creatures on earth belonging to the most popular insect order- Odonata. These are observed near the ponds, lakes, rivers, ditches and all over the marshy places. Dragonflies (suborder- Anisoptera) have broad head with confluent separated eyes. Wings are dissimilar; hind wings are broadly dilated at base and differ in venation from fore-limbs. Dragonflies belong to order Odonata and are among the most ancient of winged insects (Ramesh *et al*., 2010; Oliver and Beattie, 1993). The extant dragonflies are divided into two suborders, the Zygoptera or damselflies and the Anisoptera or true dragonflies. Silsby (2001), described about 6000 species of dragonflies in all over the world. The number of Odonata species known from India, 470 species of Odonates belonging to 139 genera and 19 families. In spite of its global significance, studies of dragonfly diversity of Bansagar reservoir have been least undertaken. Since, the main objective of this study has been conduct preliminary observation of Odonata and carried out the checklist, occurrence and richness inhibiting the Bansagar reservoir. Odonata spend their larval life in aquatic habitats and use a wide range of terrestrial habitats as adults. Ubiquitous species prevail in disturbed or temporary waters, while pristine streams, seepage and swamp forests harbour a wealth of more vulnerable, often localized species. They are valuable as indicator of aquatic and terrestrial ecosystem health (Brown, 1991). The Bansagar reservoir area is surrounded with a very large variety of trees, mini forest, vast grassland & small hill; these are the elements for architecting a preferred habitat or such species. Different ecological requirements are linked to different dispersal capacities and their high diversity of aquatic habitats in tropical forests (Orr, 2006), especially in mountain areas (Oppel, 2005) as mountains not only provide a greater contemporary diversity of habitats, but also a greater potential for survival in refugia. Odonata are an easy-to-study group and are useful for monitor the overall biodiversity of aquatic habitats and had been identified as good indicators of environmental health (Corbet, 1999; Kalkman *et al*., 2008).

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MATERIALS AND METHODS

In central India, Bansagar reservoir is a multipurpose river valley project on Sone River situated on Ganga basin in Madhya Pradesh. The study area is coordinated at 24°11'30"N

81°17'15"E, i.e., 51.4 km away from Rewa. Odonata watching and recording has been done for a period of one year from December 2014 to November 2015. The sites are visited in early in the morning from 5 to 9 am, and evening from 5 to 7 pm hours to note maximum possible species of dragonflies and record its activities.

species, followed by *Coenagrionidae* (4), *Aeshnidae* (3), *Gomphidae* (3), *Lestidae* (1) and *Platycnemididae* (1). The diversity of Odonata in the region is influenced by two major determinants. Firstly, two biogeographically realms converge in the region i.e., river side and hilly area, where both contribute assemblages that differ in their radiation history.

Table 1. List of Odonata recorded from Sone River at Bansagar Reservoir (M.P.)

S.No.	Name of Species	Common Name	Status
Order: Odonata Sub order: Zygoptera (Damselflies) Family: Coenagrionoidae			
1.	*Agriocnemis pygmaea* (Rambur, 1842)	Pigmy Dartlet	Very Common
2.	*Ischnura senegalensis* (Rambur, 1842)	Senegal Golden Dartlet	Very Common
3.	*Pseudagrion decorum* (Rambur, 1842)	Saffron-faced Blue Dart	Common
4.	*Pseudagrion rubriceps* (Selys, 1876)	Saffron-faced Blue Dart	Very Common
Family: Platycnemididae			
5.	*Copera marginipes* (Rambur, 1842)	Yellow Bush Dart	Common
Family: Lestidae			
6.	*Lestes umbrinus* (Selys, 1891)	Brown Spread wing	Very Common
Sub-order: Anisoptera (Dragonflies) Family: Aeshnidae			
7.	*Anax guttatus* (Burmeister, 1839)	Blue- tailed Green Darner	Very Common
8.	*Gynacantha bayadera* (Selys, 1891)	Parakeet darner	Rare
9.	*Hemianaxe ephippiger* (Burmeister, 1839)	Ochre-tailed Brown Darner	Rare
Family: Gomphidae			
10.	*Macrogomphus annulatus* (Selys, 1854)	Deccan Bowtail	Common
11.	*Paragomphus lineatus* (Selys, 1850)	Common Oartail	Common
12.	*Ictinogomphus rapax* (Rambur, 1842)	Common Clubtail	Common
Family: Libellulidae			
13.	*Brachythemis contaminata* (Fabricius, 1793)	Ditch Jewel	Very Common
14.	*Crocothemis servilia* (Drury, 1770)	Ruddy Mars Skimmer	Very Common
15.	*Neurothemis intermedia* (Rambur, 1842)	Ruddy Muddy Skimmer	Rare
16.	*Neurothemis tullia* (Drury, 1773)	Pied Paddy Skimmer	Very Rare
17.	*Acisoma panorpoides* (Rambur, 1842)	Trumpet Tail	Common
18.	*Orthetrum luzonicum* (Brauer, 1868)	Tricolored Marsh Hawk	Rare
19.	*Rhyothemis variegata* (Linnaeus, 1763)	Common Picture Wing	Rare
20.	*Tholymis tillarga* (Fabricius, 1798)	Coral-tailed Cloud Wing	Rare
21.	*Trithemis festiva* (Rambur, 1842)	Black Stream Skimmer	Very Common
22.	*Trithemis pallidinervis* (Kirby, 1889)	Long-Legged Marsh Skimmer	Very Common

The study has been carried out and in the in such a way that there should be least one visit in a week. Observations are made through walking a wide area of the site with the aid of binocular and digital cameras. The present study is based on study the dragonfly and damselfly population. Unidentified and uncollected Odonata were sighted the standard butterfly net was used to catch them, and the specimens were stored in paper triangles in the field. Once in the laboratory specimens were soaked in acetone to kill and then left in paper triangles dipped in acetone overnight to help preserve dry specimens. Live photos were also taken as and when caught in the field. The adult specimens were identified with the help of appropriate literatures Fraser, (1933; 1934; 1936), Mitra, (2002; 2006; 2008), Mitra *et al*., (2006, 2012), Subramanian, (2005), Andrew *et al*., (2009), and Subramanian (2009). The Odonates were categorized on the basis of their abundance in Narmada Valley Southeast region of Jabalpur which abbreviated as VC - very common, C - common, R - rare, VR - very rare (Tiple *et al*., 2008).

RESULTS

A total of 22 species representing 19 genera from 6 families were recorded from the multipurpose Bansagar reservoir (Table 1). *Libellulidae* was the dominating family with 10

Secondly, the diversity of dragonflies, being dependent on freshwater habitats, corresponds broadly with humidity gradients.

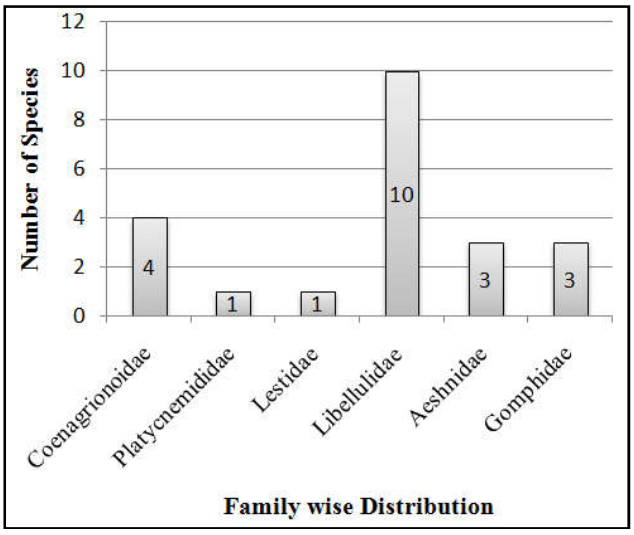

Fig. 1 Family wise Distribution of Odonata around Bansagar reservoir of Sone River

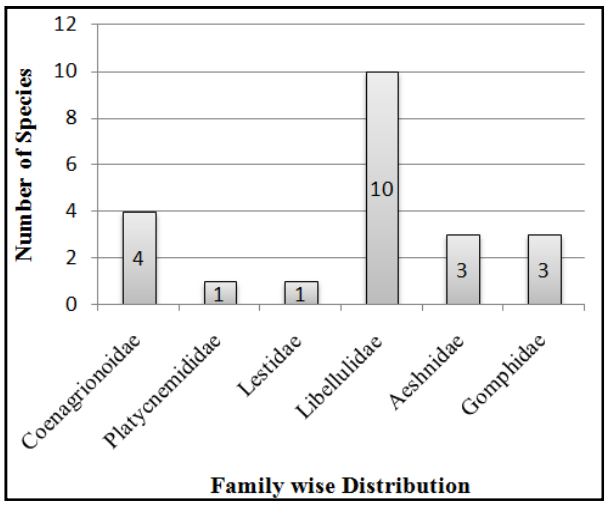

Fig. 2. Relative Abundance and Status of Odonates during the study period

DISCUSSION

The need to prepare inventory of an asset arise because of its perceived value (Divyabhanusinh, 2005) And it is applicable increase of animal also. It is a well-known fact that mapping and monitoring of biodiversity is the first step in systematic conservation planning (Margules, C.R. and R.L. Pressey, 2000) and through knowledge of living forms and indicator species of a reservoir is very essential for proper management of pollution (Das *et al*., 2011). In the present study we mainly focused on the diversity of this magnificent insect group in the reservoir area including multiple use areas and total of 22 species of Odonata were recorded. Out of which damselflies have 6 species under 3 families where *Coenagrionoidae* (4) is consisting of maximum number of species followed by *Platycnemididae* (1) and *Lestidae* (1) while dragonflies are comprise of 16 species under 3 families out of which *Libellulidae* or Skimmers are the most diverse and dominating family of dragonflies with 10 species that is followed by others such as *Aeshnidae* (3) and *Gomphidae* (3) (Fig.1). The number count method for relative abundance showed that among the 22 species of Odonates recorded, 9 species were found to be very common, 6 species were common, 6 species were rare and 1 species were very rare to the study area (Fig. 2). Subramanian (2009), reported 11 dragonfliy families, of which 972 species with *Libellulidae* and 958 species with *Gomphidae* are major families throughout the world followed by 436 species in Aeshnida, 249 species in *Corduliidae* and 123 species in *Macromiidae*. Manwar *et al*., (2012) in Maharashtra (India) recorded 22 species of dragonflies and damselflies of 4 families and 17 genera of which 50% species are of family *Libellulidae*. Tijare & Patil (2012) were observed 21 species of dragonflies from Nagpur district and *Libellulidae* families have high species richness.

Conclusion

The summary reports the status and diversity of dragonflies and damselflies. The above observations are similar to the present observations where family *Libellulidae* is the largest family carrying maximum number of species and dragonflies are amphibiotic insects found all around the freshwater bodies. The major threats to dragonfly diversity in river ecosystem are deforestation, habitat destruction due to water extraction and damming of large rivers, and invasion of alien plants, while pollution is currently only a local problem. Conserving habitats by modifying agricultural, forestry and industrial procedures and notable taxonomy and studies of the distributions and biological requirements of species, pollution Control, legislation-notably to provide protected areas, to control development and to control pollution and education and raising public awareness are strategies for Odonata conservation.

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