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# Odonata Faunal Diversity of Bhima Riverine Water Basin of Khed Tehsil, Northern Western Ghats (MS), India

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### ABSTRACT

Predatory Odonata insects spread worldwide. A flying Odonatas appeared from Triassic period. They are insectivorous. They play a vital role in agricultural pest management because they feed on small insects. The presence of Odonata insects is good sign of healthy ecosystem. The Bhima River is one of the major rivers in western and southern India which originated from Pune, part of Northern Western Ghats of Maharashtra, India. The Bhima River basin of Khed Tahasil revels 33 species belongs to 21 genera and 07 families. In the present study, 824 total numbers of individuals, family Libellulidae constituted maximum with 48.48% followed by Coenagrionidae 33.34%, Platycnennididae 6.06%, Protoneuridae 3.03%, 3.03%, Aeshnidae 3.03%, Gomphidae 3.03% and Lestidae 3.03%. Dragonflies and Damselflies are ecological indicators of aquatic ecosystem and bi-control agent and plays a spatial role.

Keywords: Bhima River, biocontrol, bioindicator, diversity, Northern Western Ghats

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### INTRODUCTION

Odonates are one of the widespread flying insects over the ecosystem such as lakes and ponds, wetland, forest, agricultural area and riverine basins. They are about more than 5000 living species, 142 genera and 18 families over the world and around 500 recognized species diversified in India [1-17]. Maharashtra is one of the rich Odonata species states of India given those varieties of habitat and unique geographical area. Odonates are amphibiotic insects having aquatic larva called nymph and terrestrial adults [18]. Odonata shows that particular habitat and perspective ecological indicator [19]. They have used against aquatic mosquitoes as bio-indicator agent and conservation management [20].

The Indian Odonata species were well distributed and reported by researchers [21-28]. A narrow ecological space of endemic odonata species area of Western Ghats of India is habitat sensitive and restricted [29-30]. The first checklist of Maharashtra state including 46 species on the locality based and then updated up to 49 species across the state [31-33]. Most of the study of Odonata scattered through the state but very few studies in Western Ghats [34]. The Bhima River originated from Northern Western Ghats, Bhimashankar Wildlife sanctuary of Khed Tahasil, Maharashtra, India. The aim of the research is to assess diversity and distribution pattern of Odonata insects around the Bhima River basin.

### MATERIAL AND METHODS

#### Study area

The Bhima River basin of Khed Tahasil, part of Northern Western Ghats (MS), India was selected for study area. The field survey was conducted on the four different sites as follows Chas Kaman (I), Kadus (II), Rajgurunagar (III) and Kharpudi (IV) riverine basins of both sides. A total four sampling sites were sampled during monsoon, winter and summer seasons from May 2022 to May 2023.

### **Data collection**

Data collection was conducted between 7.00am to 12.00pm and 3.00pm to 6.00pm when insect was active. Photographs were collected by Cannon 350D camera. After collection of photographs species were identified using by standard taxonomical literature and field guides [21-24, 35-47] at Department of Zoology, Hutatma Rajguru Mahavidyalaya, Rajgurunagar.

### Data Analysis

Statistical analysis of Odonata diversity was calculated using standard method.

### **RESULT AND DISCUSSION**

The present research of faunal diversity of Odonata species of Bhima River basins revealed that 33 species under suborders; Anisoptera (Dragonflies) and Zygoptera (Damselflies). A total no of individuals belongs to 33 species, 07 families belong to 21 genera (Table 1). The present study reveals that total 824 numbers of Odonata individuals under family Libellulidae constituted maximum with 48.48% followed by Coenagrionidae 33.34%, Platycnennididae 6.06%, Protoneuridae 3.03%, 3.03%, Aeshnidae 3.03%, Gomphidae 3.03% and Lestidae 3.03% (Figure 1).



## Noumber of individual

### Figure 1: Family wise species composition of Odonata

In the Anisoptera (Dragonfly), Libellulidae is most dominant family represent 88.89%, Aeshnidae 5.55% and Gomphidae 5.55%. While in the Zygoptera (Damselfly), Coenagrionidae is most dominant family represent Coenagrionidae 73.34%, Platycnennididae 13.34%, Protoneuridae 6.67%, and Lestidae 6.67% (Figure 2). Anisoptera is the most dominant suborder with 18 species under 03 families than Zygoptera reveals 15 species under 04 families (Table 3).



Figure 2: Family distribution of Damselfly and Dragonfly



Figure 3 Species composition of Odonata from Bhima Riverine water basin

The Bhima River basin sites having rich fauna of Odonata insects are as followed site I (Chas) 36.65%, site II (Kadus) 26.45%, site III (Rajgurunagar) 19.41% and site IV (Kharpudi) 17.47%.

Total 33 species recorded, 16 species belong to family Libellulidae (48.48%) and 11 species of family Coenagrionidae (33.34%). Similarly, Coenagrionidae and Libellulidae are two worldwide largest families which dominated the Odonata fauna of standing water from all continents [48]. The biogeographical area of Maharashtra shows high diversity of Odonata insects. The total 99 species in which two subspecies such as *Libellaga lineate* and *Libellaga indica* or *Aciagrion hisopa hisopa* and *Aciagrion hisopa krishna* as different species in the checklist. Western Ghats mountains are of high endemism area which has rich in evergreen and semi-evergreen forest. The Northern Western Ghats of Maharashtra might be the root cause of lack of data on biodiversity and distribution [49].

However, we confined total 33 species around Bhima Riverine water basin and the diversity depends on their ecosystem. The water sources, vegetation type or pattern and agricultural fields and human interference are impact on faunal abundance. Water shade, wind and light affects thermoregulation and consequently their distribution and abundance [50-54].

Order	Scientific Name		
	Aeshnidae	Anax immaculifrons	
Odonata	Coenagrionidae	Agriocnemis femina	
		Agriocnemis pygmaea	
		Enallagma geminatum	
		Ceriagrion coromandelianum	
		Ischnura aurora aurora	
		Ischnura hastata	
		Ischnura senegalensis	
		Pseudagrion decorum	
		Pseudagrion hypermelas	
		Pseudagrion rubriceps	
		Pseudagrion macrocephalum	
	Gomphidae	Ictinogomphus rapax	
	Lestidae	Lestes viridulus	
	Libellulidae	Brachythemis contaminata	
		Bradinopyga geminata	
		Cratilla lineata	
		Crocothemi serythraea	

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		Crocothemis servilia servilia
		Diplacodes trivialis
		Neurothemis intermedia intermedia
		Orthetrum glaucum
		Orthetrum pruinosum neglectum
		Orthetrum sabina sabina
		Orthetrum taeniolatum
		Pantala flavescens
		Potamarcha congener
		Tholy mistillarga
		Trithemis aurora
		Trithemis festiva
	Platycnemididae	Copera marginipes
		Copera vittata deccanensis
	Protoneuridae	Disparoneura quadrimaculata

Sr. No.	Dragonfly (S	ub order Anisoptera)	Damselfly (Sub order Zygoptera)	
	Family	Number of Individuals	Family	Number of Individuals
1	Aeshnidae	01	Coenagrionidae	11
2	Gomphidae	01	Lestidae	01
3	Libellulidae	16	Platycnemididae	02
4			Protoneuridae	01

### Table 3 Odonata species richness with the genera

Order	Family	Genus	Species
Anisoptera (Dragonfly)	03	13	18
Zygoptera (Damselfly)	04	08	15

### CONCLUSION

Dragonflies and damselflies are excellent and abundant bio markers of ecosystem. They play a vital or spatial role as bio-indicator and bio-agent in aquatic and agricultural ecosystem. The dragonflies determine the health of water ecosystem and damselflies are predatory in nature. Due to the human destruction, they have need to conserve their habitat to maintain their population count. Management of Dragonflies and Damselflies are useful to evaluate water qualities as well agriculture pest management.

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### **CONFLICT OF INTEREST**

There is no any conflict of interest.

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