

# **A Survey Study on Odonata in Rabo Dam Area, Raigarh, Chhattisgarh, India**

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## **Abstract**

An extensive study provides current status, species richness and distribution pattern of Odonate diversity in Rabo dam area. Rabo Dam is constructed on the Kurkut River a tributary of the river mand in Bagbhara area, District Raigarh, (Chhattisgarh) India. The geographical location of the Rabo Dam area provides suitable environmental conditions for Odonatan's habitat and diversity. An observation on Odonata diversity was carried out during the period from March 2021 to February 2022. Three study sites were selected to assess the diversity of Odonatan species. A total 41 of Odonatan species were identified, representing two suborders of Class Insecta of Phylum Arthropoda. Zygoptera contributed 18 species under 5 families and Anisoptera with 23 species under 3 families. Zygoptera and Libellulidae was most dominant family by contributing 18 species but Libellulidae was the most common species found in all three study sites. Family Chlorophylidae was least common species which restricted to only one study site. In the present study 10 species of Family Coenagrionidae, 3 species of Gomphidae, 3 species of Protoneuridae, 2 species of Platycnemididae, 2 species of Lestidae, 2 species of Aeshnidae were recorded. The observation showed the interesting perching 'Obelisk pose, in species Trithemis pallidinervis. Observation also showed 'tandem position, in species Copera marginipes.

In this area the odonate diversity is still unexplored hence the present study will provide the current status and base line data of odonatan diversity for further attention and research activities.

**Key words: Odonata, Diversity, Rabo dam, species richness**

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## **I. INTRODUCTION**

Odonata is one of the most ancient orders of Phylum Arthropoda. It is a group of predatory insects consists of three suborder Anisoptera (dragonflies), Zygoptera (damselflies) and Anisozygoptera (ancient dragonflies). The Odonata form a clad, which has existed since Permian period. (Trueman,2007). The name Odonata, derived from the Latin word 'Odonato' which means toothed jaw. (Mickel, Clearance E.,1934)

There are approximately 5740 species of odonata were recorded in the globe. 474 species in 142 genera and 18 families exist in India (Subramanian, 2014); 69 species are listed in the IUCN red list of threatened species and *Indothemis carnatica* comes near threatened condition (Tiple and Chandra, 2013).

Odonates are characterised by colourful insects having two pairs of net veined wings, three pair of legs and very large compound eye. Body divided into three parts, large head, thorax and long slender abdomen. Odonates have small and hair like antennae. The clasper located on the last segment of the male's abdomen, have a shape unique to each species of Odonata.

Odonates play an important biological, ecological and bio topic roles. Odonates are an agronomic significant species, their larva and adults act as a natural bio-controlling agent by controlling pest population (Khaliya, 2009). The larva is a sophisticated predator. Their cryptic colouration and keen eyesight make them an effective predator. (Subramanian, 2005) Odonates are very sensitive to environmental change. It makes them some of the most visible indicators of wet land, healthy and diversified habitat (Mark, Klym et al., 2003). They also play a significant role as ideal surrogate taxa for identifying fresh water biodiversity and hot spot for conservation (Hart et al., 2014).

The species richness in number is higher during monsoon (September-October) and their number in count is gradually decline from November to January and lower in winter (December- March) season. (Sahu R. and Rai R.K.,2019)

In this area the Odonate diversity is still unexplored hence the present study was carried out to study and asses the present status of this ecological significant animal species.

## II. MATERIAL AND METHODS

### Study site

Odonates are usually the most conspicuous insect group near any body of water, although migrating or non-breeding adults often travel great distance from water (Klym, Mark et al,2003). Rabo dam has been constructed about 25 km on Kurkut River. Total catchment area of dam is 783 km. Rabo dam is located at the latitude 22.0993 N, 83.2630E. In this diversity survey study, 3 different sites were selected. All the three sites provide three different habitats -- Dam area (wet land), park area (open tract), and crop fields area (moist). The study sites were denoted as –

**Site No. 1.** – Dam and bank area of Kurket river.

**Site No. 2.** – Jindal park area and hilly area around dam.

**Site No. 3.** – Crop fields area around dam.

**Study Duration:** The study sites were surveyed between 9:00 am to 11:00am. and 3:00pm to 5:00pm from March 2021 to February 2022.

These sites were visited regular, opportunistic and at regular intervals. The capture, identify and released technique were undertaken for the study of odonatan diversity. (Rai R.K. and Raj B.S. 2015(A, B).

The adult Odonates were photographed with the help of canon 700D (EFS55-250mm, macro1.1m/3.6ft) digital camera. In case of doubt, Odonates were trapped with the help of sweep net. Captured and netted Odonates were identified, photographed and released in their natural habitat where they captured. Odonates were identified by the using keys provided by Fraser (1934, 1936), Varshney (1995), Subramanian, (2005), Mitra (2006), Andrew et al, (2008), Prasad and Subramanian (2009), Nire Manoj V. (2011). A field guide note book as discussed by K.A. Subramanian, 2009 was also prepared. Not a single specimen killed, narcotised and preserved during study.



Fig. No.(i) Study Area



(ii) Site:1



(iii) Site : 2



(iv) Site :3

## III. OBSERVATIONS

**Table-1** Number of species identified

S.N.	Name of species	No of species	percentage
1	Libellulidae	18	43.9%
2	Gomphidae	03	7.3%
3	Aeshnidae	02	4.8%
4	Coenagrionidae	10	24.4%
5.	Protoneuridae	03	7.3%
6.	Platycnemididae	02	4.8%
7.	Lestidae	02	4.8%
8.	Chlorophylidae	01	2.4%
	Total	41	100%

**Table-2** The observed Odonates are listed in following table -

S. No.	Genus and Species of Odonata	Family	Site 1	Site 2	Site 3	Status	IUCN status
1.	<i>Acisoma panorpoides</i>	Libellulidae	Y	N	Y	LC	lc
2.	<i>Brachythemis contaminata</i>	Libellulidae	Y	Y	Y	VC	lc
3.	<i>Brachydiplax chalebea</i>	Libellulidae	Y	N	N	LC	lc
4.	<i>Brachydiplax farinosa</i>	Libellulidae	Y	N	N	LC	lc
5.	<i>Diplocodes trivilis</i>	Libellulidae	Y	Y	Y	VC	lc
6.	<i>Diplacodes nebulosa</i>	Libellulidae	Y	Y	Y	LC	lc
7.	<i>Neurithemis intermedia</i>	Libellulidae	Y	N	Y	C	lc
8.	<i>Orthetrum glaucum</i>	Libellulidae	Y	N	Y	LC	lc
9.	<i>Orthetrum pruinsum</i>	Libellulidae	Y	N	N	LC	lc
10.	<i>Orthetrum Sabina</i>	Libellulidae	Y	Y	Y	LC	lc
11.	<i>Pantala flavescense</i>	Libellulidae	Y	Y	Y	VC	lc
12.	<i>Potamarch congener</i>	Libellulidae	Y	Y	Y	C	lc
13.	<i>Rhyothemis variegata</i>	Libellulidae	Y	N	Y	C	lc
14.	<i>Tholymis tillarga</i>	Libellulidae	Y	N	Y	R	lc
15.	<i>Tramea limbata</i>	Libellulidae	Y	N	Y	R	lc
16.	<i>Trithemis aurora</i>	Libellulidae	Y	Y	Y	VC	lc
17.	<i>Trithemis festiva</i>	Libellulidae	Y	N	N	C	lc
18.	<i>Trithemis pallidinervis</i>	Libellulidae	Y	Y	Y	VC	lc
19.	<i>Ictinogamphus rapax</i>	Gomphidae	Y	N	Y	C	lc
20.	<i>Onychogamphus forcipatus</i>	Gomphidae	Y	N	N	LC	lc
21.	<i>Paragomphus lineatus</i>	Gomphidae	Y	N	Y	LC	lc
22.	<i>Anax guttatus</i>	Aeshnidae	N	Y	Y	LC	lc
23.	<i>Anax immaculifrons</i>	Aeshnidae	N	Y	Y	R	lc
24.	<i>Agriocnemis femina</i>	Coenagrionidae	Y	N	N	VC	lc
25.	<i>Agriocnemis pygmaea</i>	Coenagrionidae	Y	N	N	VC	lc
26.	<i>Ceriagrion coromandelian</i>	Coenagrionidae	Y	Y	Y	VC	lc
27.	<i>Ceriagrion olivaceum</i>	Coenagrionidae	Y	Y	Y	C	lc
28.	<i>Ischnura aurora</i>	Coenagrionidae	Y	Y	Y	VC	lc
29.	<i>Ischnura senegalensis</i>	Coenagrionidae	Y	Y	Y	VC	lc
30.	<i>Pseudagrion decorum</i>	Coenagrionidae	Y	N	Y	VC	lc
31.	<i>Pseudagrion microcephalum</i>	Coenagrionidae	Y	N	Y	C	lc
32.	<i>Pseudagrion rubriceps</i>	Coenagrionidae	Y	N	Y	VC	lc
33.	<i>Pseudagrion spencei</i>	Coenagrionidae	Y	N	N	R	lc
34.	<i>Lestes umbrinus</i>	Lestidae	Y	N	N	LC	lc
35.	<i>Lestes viridulus</i>	Lestidae	Y	Y	Y	C	lc
36.	<i>Copera marginipes</i>	Platycnemididae	Y	N	N	LC	lc
37.	<i>Copera vittata</i>	Platycnemididae	Y	N	N	LC	lc
38.	<i>Elattonera nigerrima</i>	Protoneuridae	Y	N	N	R	lc
39.	<i>Disproneura quadrimaculata</i>	Protoneuridae	Y	N	N	LC	lc
40.	<i>Prodasineura verticalis</i>	Protoneuridae	Y	N	N	R	lc
41.	<i>Libellago indica</i>	Chlorocyphidae	Y	N	N	VR	lc

NOTE: Detail of terminologies used in the table-

C= Common , VC= very common, LC = less common, R= rare, VR= Very rare. IUCN Status: lc = least concern



(iv) *Brachythemis contaminata* (Ditch Jewel)



(v) *Crocothemis servilia* (Ruddy Marsh Skimmer)



(vi) *Diplacodes trivialis* (female) (Ground skimmer)



(vii) *Trithemis pallidinervis* (Long-Legged Marsh)



(viii) *Ischnura senegalensis* (Male) (Senegale dartlet)



(ix) *Agriocnemis pygmaea* (male) (Pigmy Dartlet)



(x) *Orthetrum sabina* (Green Marsh Hawk)



(xi) *Ctinogomphus rapax* (Common Clubtail)



(xii) *Pseudagrion micocephalum* (Male) (**Blue grass dart**)



(xiii) *Ischnura aurora* (Male) (**Golden Dartlet**)



(xiv) *Agriocnemis femina* (male) (**Pruinosed dartlet**)



(xv) *Copera marginipes* (Tandem position)

#### IV. RESULT AND DISCUSSION

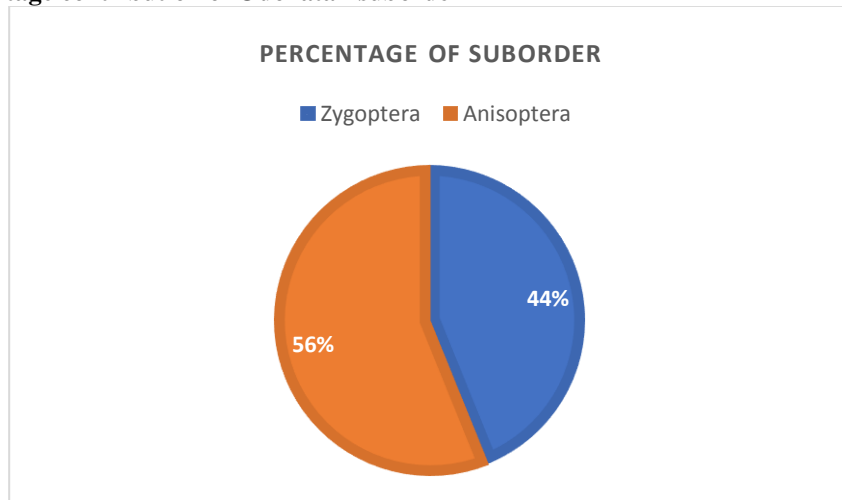
A total no. of 41 species representing 9 families of odonates has been recorded during this survey study from three different study sites. The study revealed remarkable odonate diversity dominated by Libellulidae encompassing 18 species, followed by Coenagrionidae with 10 species, gomphidae with 03, Protoneturidae with 3 species, Lestidae with 02 species and Platycnemididae with 2 species. The least common species is chlorophyllide with only one species. 9 numbers of families are given in Table no. 1. The detailed species names and the sites from where they have been observed are given in Table 2.

It has been noted that Libellulidae comprises 43.9% of total species identified from survey sites; followed by 24.4 % of Coenagrionidae; 7.3% of Gomphidae and protoneturidae; 4.8% Aeshinidae, Lestidae and Platycnemididae; 2.4% of Chlorophyllidae family. *Brachythemis contaminata*, *Diplocodes trivilis*, *Orthetrum Sabina*, *Trithemis pallidinervis*, *Ceriagrion coromandelian*, *Ischnura aurora*, *Ischnura senegalansis* were common in all study sites. The most common species is *Diplocodes trivilis* which can be seen in all season. *Pantala flevesence* is the most abundant in rainy season. *Ischnura aurora* and *Ceriagrion coromandelian* are most common and dominant damselflies.

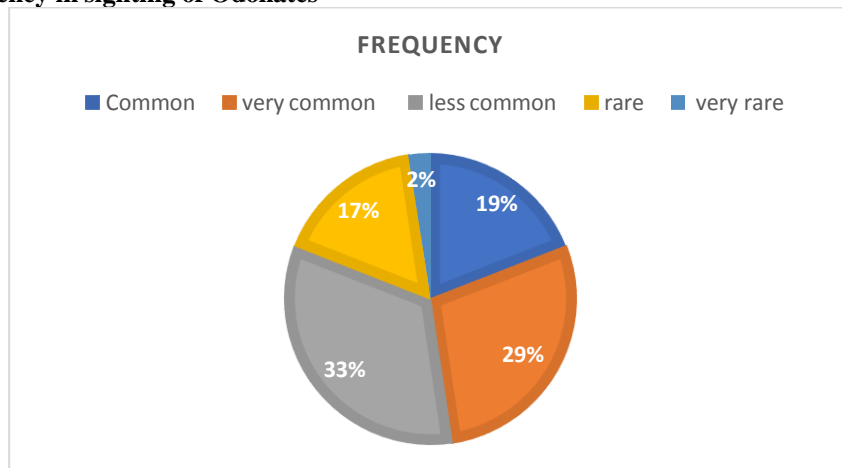
Our observation showed a specific type of perching position in species *Trithemis pallidinervis*. In this position it raised its abdomen until its tip point at the sun. It showed interesting habit of perching which is called 'Obelisk pose'. This pose of odonates prevents them from overheating on sunny days. (Mark Klym et al., 2003)

Observation also showed 'tandem position, in species *Copera marginipes*. In this position female allows the victorious male to seize her by the prothorax with its legs first and then the specialised anal appendages, both getting attached together like lock and key. (Nire Manoj V., 2011). The species richness in number is higher during monsoon (September-October) and their number in count is gradually decline from November to January and lower in winter (December- March) season. (Sahu R. and Rai R.K., 2019)

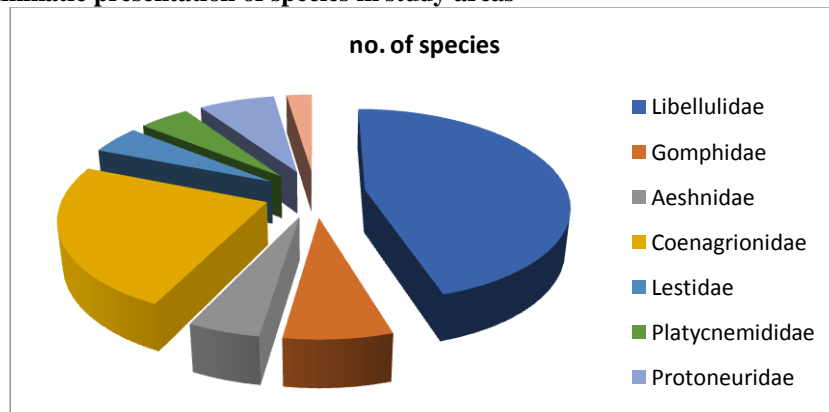
(i) Percentage contribution of Odonatan suborder



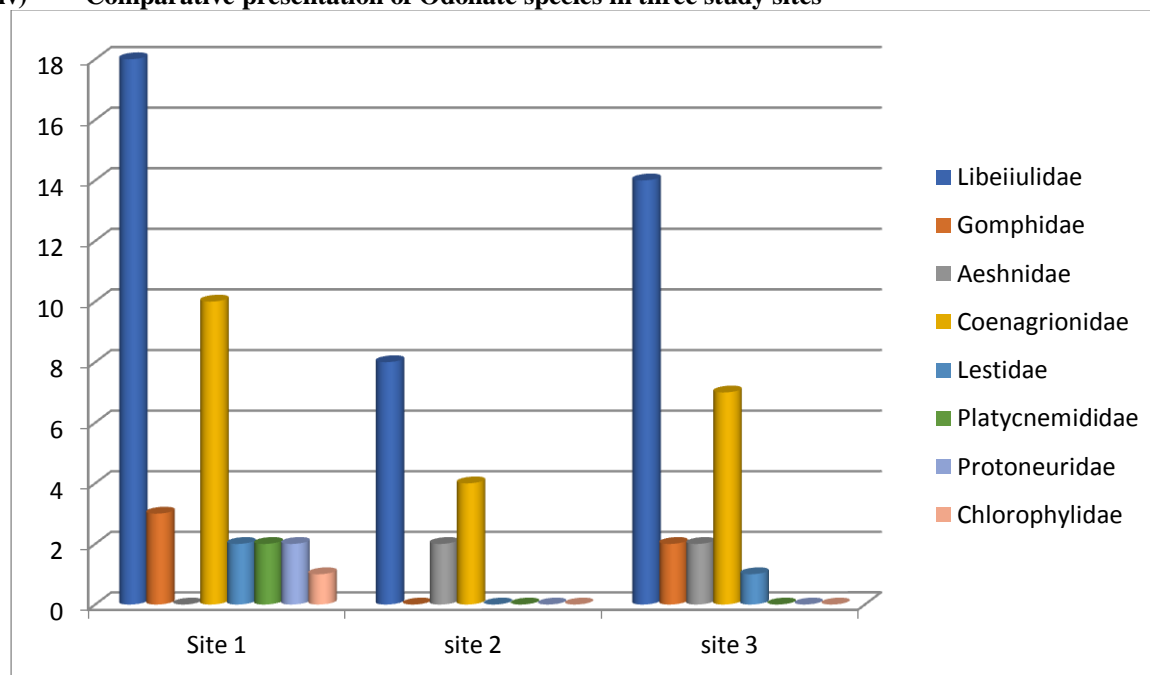
(ii) Frequency in sighting of Odonates



(iii) Diagrammatic presentation of species in study areas



(iv) Comparative presentation of Odonate species in three study sites



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