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Diversity and abundance of Dragonflies and Damselflies (Order - Odonata) of Pohara Range in Pohara – Malkhed Reserve Forest, Maharashtra (India)

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ABSTRACT

The present work is aimed to study diversity and abundance of dragonflies and damselflies of Pohara range in Pohara – Malkhed Reserve Forest, Maharashtra. This study has been carried out for one year from June 2012 to May 2013. We observed six families of Dragonflies and Damselflies (Order – Odonata). The most abundant family was Lebellulidae comprising 20 species followed by Coenagrionidae comprising 10 species. The list abundant families were Gomphidae, Ashnidae, Platycenemididae and Lestidae comprise one, two, one and one species respectively. Species richness (S), Relative abundance (P), Species diversity, and Evenness (E) were studied.

KEYWORDS Diversity, Dragonflies and Damselflies, Pohara range, abundance

INTRODUCTION:

Dragonflies and damselflies (Order – Odonata) are multicolored predatory insects of freshwater habitat and characterized by their elongate body, extended wings and large eyes. Odonates are with the most exciting and energetic of all insects. Silsby (2001), recorded eight super families, 29 families and some 58 sub-families of dragonflies for just about 600 genera and 6000 named species have up to now been explained all over the world. India is also most diverse with above 500 known species of Odonata (Subramanian, 2005). These are carnivorous and a number of species are predators. They prefer to live in freshwater, non polluted and well oxygenated habitats. Therefore Dragonflies and Damselflies are precious bio-indicators for environmental contamination studies (Lehmkuhl, 1976; Morin, 1984; Needham, et al., 2000).

Yet, there is no report on Diversity and abundance of Dragonflies and Damselflies of Pohara range in Pohara – Malkhed Reserve Forest, present in Amravati district of Maharashtra state. The present investigation was, therefore, done to put together the study on Diversity and abundance of Dragonflies and Damselflies of Pohara range in Pohara – Malkhed Reserve Forest, Maharashtra.

MATERIALS AND METHODS:

1) Study area:

Pohara range is the part of Pohara – Malkhed Reserve Forest, Amravati, just outskirt of Amravati city. Pohara – Malkhed Reserve Forest lies at 20'57'N and 77'57'E, cover the total area of 80 km² (Fig 1b). Pohara – Malkhed Reserve Forest is very well known for the avian diversity. Various migratory Birds are recorded by various workers in present forest. The vegetation of forest consist of both natural forest i.e. dry-deciduous, evergreen semi-evergreen, grassland and teak, salai, Khair and Palas plantation (Wadatkar and Kasambe., 2002)



Fig. 1a: India

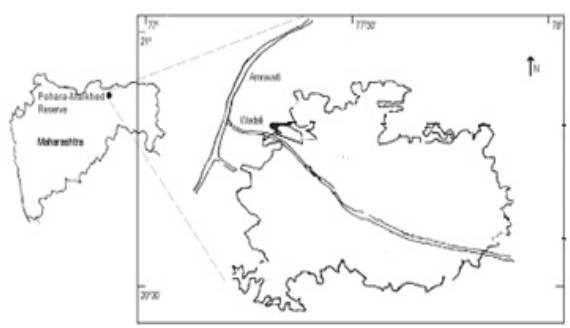


Fig. 1b: Study Area: Pohara – Malkhed Reserve Forest, Maharashtra

2) Specimen observations and photography:

The present study was done for one year from June 2012 to May 2013. Specimens of Dragonflies and damselflies were observed in field with careful note on their habitats. Repeated visits to field have been made in morning, afternoon and evening time. For diversity and abundance, specimen number of each species has been counted by visual observations. The specimens were identified in the field by using field guides of Subramanian (2005, 2009) and the Handbook of Common Odonates of Central India by Andrew, et al (2009). Most specimens were identified in the field by visual observations. The photography was done by using digital camera made by Nikon model no. L810. The specimens of unidentified species were collected by standard insect collecting net and then further identifications of unidentified specimens were carried out in laboratory using Binocular microscope and by using the available literature the British Fauna of India by Fraser (1933, 1934 and 1936).

3) Methodology:

During survey standard Transect method was used. Different transects of 1 km length was drawn in different parts of the present area and the breadth of each transect was 20 feet. Results were recorded by visualizing the specimens through-

out transect and after that summarization of all transects were done.

Data analysis:
Diversity indices like Shannon H', Shannon Hmax, Shannon J', Simpsons Diversity (D), Simpsons Diversity (1/D, Richness were calculated using Biodiversity Pro software version 2.

RESULTS AND DISCUSSION:
In present investigation of twelve months we recorded 1881 individuals of 37 species of order Odonata belonging to 24 genera, six families and two suborders. The families are Lebellulidae, Coenagrionidae, Ashnidae, Gomphidae, Platycenemididae and Lestidae. The most dominant family in present study is Lebellulidae which comprises about 14 genera (58.33% of total genera) and 22 species (58.45% of total species). The list abundant families are Ashnidae, Gomphidae, Platycenemididae and Lestidae which comprises of two, one, one and one species respectively. Similar work was also done in Chatri lake region by Manwar, et al (2012) and recorded 22 species. Table 1 shows the taxonomic composition and Abundance of each species from different months in the study area during the study period in Pohara range in Pohara – Malkhed Reserve Forest. We also calculated Species richness, Species diversity which is also shown in table 2.

Table1: Species list of dragonflies and damselflies found in Pohara range in Pohara – Malkhed Reserve Forest, Maharashtra with taxonomic composition and month wise abundance of each species.

SN	NAME OF SPECIES	J	J	A	S	O	N	D	J	F	M	A	M
1	Acisoma panorpoides (Rambur, 1842)	1	4	5	7	6	9	5	2	4	6	3	2
2	Aethriamanta brevipennis (Rambur, 1842)	-	2	1	2	1	2	2	3	-	-	-	-
3	Brachythemis contaminata (Fabricius, 1793)	14	21	13	17	12	9	16	12	17	11	25	13
4	Bradinopyga geminata (Rambur, 1842)	2	2	1	2	3	2	2	2	3	2	1	1
5	Crocothemis servilia (Drury, 1770)	2	7	5	6	8	5	4	3	2	3	2	3
6	Diplacodes lefebvrii (Rambur, 1842)	2	1	3	2	2	1	2	2	1	2	3	2
7	Diplacodes trivialis (Rambur, 1842)	7	1	3	2	6	7	5	5	3	4	2	3
8	Orthetrum chrysis (Selys, 1891)	1	2	5	3	7	5	8	3	2	2	1	1
9	Orthetrum glaucum (Brauer, 1865)	1	3	3	3	2	-	-	-	-	-	-	-
10	Orthetrum pruinosum (Burmeister,1839)	2	2	1	3	2	1	1	3	1	2	2	1
11	Orthetrum Sabina (Drury, 1770)	4	3	8	11	7	9	9	10	16	9	17	11
12	Pantala flavescens (Fabricius, 1798)	10	12	15	19	27	3	2	7	6	5	3	2
13	Potamarcha congener (Rambur, 1842)	2	-	-	-	-	-	-	-	1	2	2	1
14	Rhyothemis variegata (Linnaeus, 1763)	1	1	4	3	5	4	3	4	5	2	3	2
15	Tholymis tillarga (Fabricius, 1798)	-	1	2	2	5	3	4	4	2	-	-	-
16	Tramea limbata (Desjardins,1832)	3	9	2	2	3	3	2	3	1	2	3	2
17	Tramea virginia (Rambur, 1842)	2	5	2	3	2	1	3	3	4	3	5	3
18	Trithemis aurora (Burmeister, 1839)	1	2	3	2	4	5	6	4	3	2	2	1
19	Trithemis festiva (Rambur, 1842)	2	1	2	3	2	3	2	2	2	1	2	2
20	Trithemis kirbyi (Selys, 1891)	2	-	-	-	-	-	-	1	2	2	3	2
21	Trithemis pallidinervis (Kirby , 1889)	3	2	6	3	2	3	2	5	2	5	2	3
22	Zyxoma petiolatum (Rambur, 1842)	-	-	-	-	-	-	-	-	-	-	-	3
23	Ictinogomphus rapax (Rambur, 1842)	3	8	12	9	11	13	9	7	5	3	4	5
24	Anax immaculifrons (Rambur, 1842)	1	2	2	3	2	2	1	2	3	1	2	1
25	Anax guttatus (Burmeister, 1839)	5	3	6	8	7	5	6	5	3	2	4	2
26	Agriocnemis femina (Brauer, 1868)	3	2	1	8	7	9	11	12	1	7	5	3
27	Agriocnemis pygmaea (Rambur, 1842)	5	9	5	6	17	15	16	17	4	3	4	1
28	Agriocnemis splendidissima (Laidlaw, 1919)	6	5	3	6	5	5	7	2	3	-	-	-
29	Ceriagrion coromandelianum	3	6	6	7	5	4	7	7	3	11	5	4
30	Ischnura senegalensis (Rambur, 1842)	3	13	12	9	17	11	8	13	7	6	4	3
31	Ischnura aurora (Brauer, 1865)	1	2	2	3	6	9	7	2	5	2	1	2
32	Mortonagrion varralli (Fraser, 1920)	3	2	3	2	2	3	2	2	1	2	2	3
33	Pseudagrion microcephalum (Rambur,1842)	3	2	5	7	8	6	8	11	9	11	6	4
34	Pseudagrion rubriceps (Selys, 1876)	3	3	3	2	5	4	4	3	3	4	5	2
35	Rhodischnura nursei (Morton, 1907)	8	7	9	11	12	14	16	8	5	6	7	3
36	Lestes elatus (Selys,1862)	5	4	3	6	3	2	1	3	1	-	-	-
37	Copera marginipes (Rambur, 1842))	5	6	9	3	7	8	6	8	2	4	3	2

Table 2: Alpha diversity indices for different months of the study period in Pohara range in Pohara – Malkhed Reserve Forest, Maharashtra.

Index	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Shannon H'	1.421	1.384	1.421	1.424	1.411	1.424	1.407	1.428	1.392	1.395	1.331	1.39
Shannon Hmax	1.531	1.531	1.531	1.531	1.531	1.519	1.519	1.531	1.531	1.491	1.491	1.505
Shannon J'	0.928	0.904	0.928	0.93	0.921	0.937	0.926	0.932	0.909	0.935	0.892	0.924
Simpsons Diversity (D)	0.04	0.049	0.04	0.042	0.045	0.039	0.042	0.04	0.048	0.041	0.064	0.045
Simpsons Diversity (1/D)	24.986	20.542	24.78	24.074	22.121	25.671	23.791	24.977	20.734	24.319	15.509	22.166
Richness	34	34	34	34	34	33	33	34	34	31	31	32

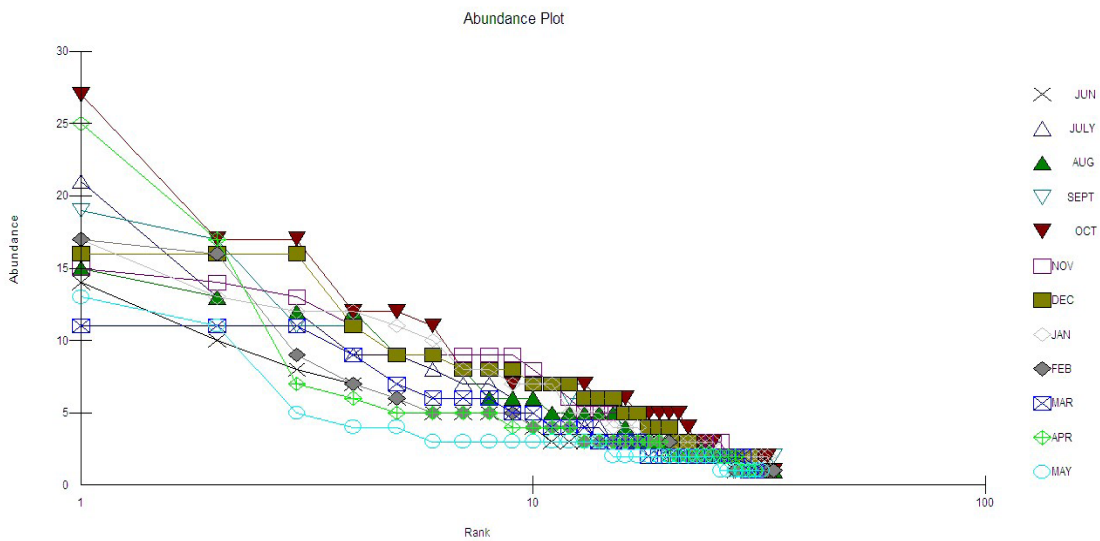


Fig 1: Species rank Abundance plot for different months of the study period.

During the present investigation Dragonflies and Damselflies from different months of the study period were compared and Shannon H', Shannon Hmax, Shannon J', Simpsons Diversity (D), Simpsons Diversity (1/D, Richness were calculated by using Biodiversity pro software 2.. In January there is highest value of Shannon H' which is 1.428 and the list is seen in the April which is 1.331. The almost same orders are also seen in Shannon J', Simpsons Diversity, Richness indices (table 2). The value Simpson index (D), which is very small in all months of the study period indicate that the present study area contain high diversity, higher values of Simpsons Diversity index (1/D) and Shannon J' also indicate the same result. According to the abundance the different species were ranked which is shown in the Fig 1.

CONCLUSION:

From the above investigation we conclude that the Pohara range of Pohara - Malkhed Reserve forest is very much rich in Dragonflies and Damselflies diversity. This rich diversity of Pohara range is may be due to less encroachment of human activities in it. But some protection plans have to make in the forest to protect and build up the diversity.

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