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RESEARCH ARTICLE

PRELIMINARY STUDY OF ODONATES IN SOUTHEAST REGION OF NARMADA VALLEY, JABALPUR (M.P.)

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ABSTRACT

Biodiversity protection and conservation is a national and international agenda and responsible for sustainable development of a region or a country and secondly Odonates are potential bio control agents of many invertebrates. Odonate assemblage from Narmada Valley in Jabalpur has been investigated. A total of 25 species of Odonata have been distributed in 7 families were sampled. In order Odonata, Libellulidae family is most dominating family, with 10 species followed by Coenagrionidae with 7 species and others have fewer representatives. Mostly Odonates were aggregated due to habitat specific nature and random distribution indicates availability of resource utilization to survive but, in the urban forest area high anthropogenic disturbances were observed which creates high biotic pressure on forest. A detailed list of Odonates recorded from urban forest area is presented.

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INTRODUCTION

Perennial river system with different habitat types provides good opportunities to Odonates, the wonderful insect groups to flourish and survive. Biodiversity conservation and management are worldwide concern (Ramesh *et al.*, 2010), where determining the diversity levels of indicator groups of ecosystem should permit the prediction of other taxa to be present i.e., the importance and appropriateness of using invertebrate groups as indicator (Oliver and Beattie, 1993; Pearson, 1994).

With the exception of Antarctica, Odonata are widespread and abundant in all continents, although centres of species richness typically occur in tropical forests (Kalkman *et al.*, 2008). In the invertebrate Odonates include insects known as dragonflies or damselflies and are always attract the human beings for their variety of colour, powerful flight and extraordinary sense of vision.

Silsby (2001) described about 6000 species of dragonflies in all over the world. At present, the Odonata have about 5,680 species worldwide although the actual number of species may total 7,000 and the rate of new descriptions is currently approximately 200 Odonata species per decade (Kalkman *et al.*, 2008) out of which Subramaniam (2009) revealed 470

species in 139 genera and 19 families exist in India that are valuable as indicators of aquatic and terrestrial ecosystem health (Brown, 1991) and also play a vital role as prey and predator to maintain the balance of tropic levels of food chain.

They are also an important and widespread component of freshwater ecosystems, being top predators (Corbet, 1962). A recent study showed that in a global assessment about 10% of the world's dragonflies would probably be regarded as Threatened and 35% as Data Deficient (Clausnitzer *et al.*, 2009). Narmada valley lies at the bank of the river Gaur and river Narmada in the way of Bargi and about 20 km southeast of Jabalpur. 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 localised species.

The Narmada Valley 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

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for survival in refugia. Species with narrow niches often disperse poorly, while pioneers of temporal habitats are excellent colonisers, making Odonata a particularly good group for evaluating habitat connectivity. Odonata are an easy-to-study group and are useful for monitoring the overall biodiversity of aquatic habitats and had been identified as good indicators of environmental health (Corbet, 1999; Kalkman *et al.*, 2008).

MATERIAL AND METHODS

Survey of dragonflies was made by visiting various areas in Southeast region of river Gaur to river Narmada, i.e., 20 km away from Jabalpur city. Dragonfly watching and recording has been done for a period of seven months from January 2015 to August 2015.

The sites were 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. The study has been carried out in such a way that there should be at least one visit in a week. Observations were made through walking a wide area of the site with the aid of binoculars and digital cameras.

The present study is based on the study of dragonfly and damselfly population. The adult specimens were identified with the help of identification keys provided by Fraser (1933, 1934, and 1936), Mitra (2006), 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 is abbreviated as VC - very common, C - common, R - rare, VR - very rare (Tiple *et al.*, 2008).

RESULT

A total of 25 species belonging to 7 families and 2 sub orders were collected from the selected site. The diversity of Odonata in the region is influenced by two major determinants. Firstly, two biogeographical realms converge in the region, which both contribute to assemblages that differ in their radiation history. Secondly, the diversity of dragonflies, being dependent on freshwater habitats, corresponds broadly with humidity gradients.

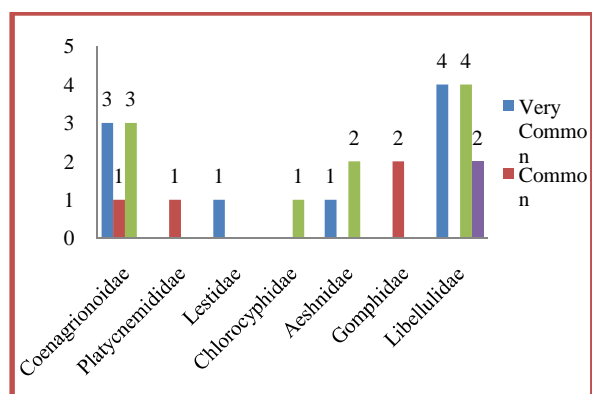


Fig.1 Family wise distribution of Odonata including number of species and their relative status

Table 1 List of Odonata recorded from Southeast region of Narmada Valley Jabalpur (M.P.)

S. No.	Name of Species	Status
Order: Odonata Sub order: Zygoptera (Damselflies) Family: Coenagrionidae		
1	Agriocnemis pygmaea (Rambur, 1842)	Very Common
2	Agriocnemis pieris (Laidlaw, 1919)	Rare
3	Enallagma parvum (Selys, 1876)	Rare
4	Ischnura senegalensis (Rambur, 1842)	Very Common
5	Pseudagrion decorum (Rambur, 1842)	Common
6	Pseudagrion rubriceps (Selys, 1876)	Very common
7	Rhodischnura nursei (Morton, 1907)	Rare
Family: Platycnemididae		
8	Copera marginipes (Rambur, 1842)	Common
Family: Lestidae		
9	Lestes umbrinus (Selys, 1891)	Very Common
Family: Chlorocyphidae		
10	Libellago lineataindica (Fraser, 1928)	Rare
Sub-order: Anisoptera (Dragonflies)		
Family: Aeshnidae		
11	Anax guttatus (Burmeister, 1839)	Very Common
12	Gynacantha bayadera (Selys, 1891)	Rare
13	Hemianaxa phippiger (Burmeister, 1839)	Rare
Family: Gomphidae		
14	Macrogomphus annulatus (Selys, 1854)	Common
15	Paragomphus lineatus (Selys, 1850)	Common
Family: Libellulidae		
16	Brachythemis contaminata (Fabricius, 1793)	Very Common
17	Crocothemis servilia (Drury, 1770)	Very Common
18	Neurothemis intermedia (Rambur, 1842)	Rare
19	Neurothemis tullia (Drury, 1773)	Very Rare
20	Orthetrum luzonicum (Brauer, 1868)	Rare
21	Orthetrum taeniolatum (Schneider, 1845)	Very Rare
22	Rhyothemis variegata (Linnaeus, 1763)	Rare
23	Tholymis tillarga (Fabricius, 1798)	Rare
24	Trithemis festiva (Rambur, 1842)	Very Common
25	Trithemis pallidinervis (Kirby, 1889)	Very Common

DISCUSSION

A total of 25 species of Odonata, damselflies have 10 species under 4 families out of which Coenagrionidae is consisting of maximum number of species followed by Platycnemididae, Lestidae and Chlorocyphidae with 1 species each while dragonflies are comprised of 15 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 with 3 species and Gomphidae with 2 species.

Subramanian (2009) reported 11 dragonfly families, of which 972 species with Libellulidae and 958 species with Gomphidae are major families throughout the world followed by 436 species in Aeshnidae, 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. The relative abundance showed that among the 25 species of Odonates recorded, 9 species were found to be very common, 4 species were common, 10 species were rare and 2 species were very rare to the study area.

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.

Odonates have little economic value, although they are used as food and as magical or medicinal resources at a local scale and to an unknown extent may influence populations of disease vectors. The group features prominently in nature management and they are often used as indicators for environmental health and conservation management. Large scale and multi-taxa conservation plans for river systems are needed in order to establish a balance between agriculture, development and nature conservation and Development of a sustainable network of local experts and volunteers is needed to facilitate the conservation and monitoring of dragonfly and damselfly species and habitats.

Recommendation concern for conservation

1. Research-notably taxonomy and studies of the distributions and biological requirements of species.
2. Pollution Control.
3. Legislation-notably to provide protected areas, to control development and to control pollution.
4. Education and raising public awareness.

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