



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2019; 7(3): 301-303

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Received: 07-03-2019

Accepted: 09-04-2019

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Diversity of some odonatans insects in Kota, Rajasthan, India

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Abstract

Order *Odonata* is an important group of insects as it includes ecologically and environmentally valuable species. *Odonata* are ecological indicators. Studies on diversity and distribution of fauna are prerequisite of biodiversity conservation. In the present study attempt has been made to enlist dragonflies and damselflies in four different areas of Kota: Karani mata, C.V. garden, Bhitariya Kund and Yatayat Park. The study was conducted from September 2014 to August 2016. Present investigation revealed the presence of 12 species of *Odonata* belonging to 2 families (Libellulidae, Coenagrionidae). In the study area the most dominant family was Libellulidae (7 species) and Coenagrionidae (5 species). The abundance of species was also recorded. Out of the 12 species recorded in 4 survey areas 3 species are abundant, 7 species are occasional and 2 species are rare in the study site. The study indicates a rich and diverse fauna in the survey area.

Keywords: Diversity, *Odonata*, dragonflies, damselflies, Kota

1. Introduction

Odonata is a primitive group of insects, firstly appeared in carboniferous era (Subramanian, K.A. 2005) ^[1] and popularly known as dragonflies (suborder Anisoptera) and damselflies (suborder Zygoptera) (Mitra 2006) ^[2]. In ecosystem as top invertebrate predator their both larval and adult stages play a significant role in the food chain (Sharma *et al.* 2007) ^[3, 4]. The prey of adults consists mostly of the harmful insects and thus has a regulatory impact on the ecosystem. They also play a vital role as prey and predator to maintain the balance of trophic levels of food chain. Most species of odonates are highly specific to a habitat, some have adapted to urban areas and make use of man-made water bodies. Habitat specificity has an important bearing on the distribution and ecology of dragonflies and damselflies. Odonates, being predators both at larval and adult stages, play a significant role in a ecosystem. They are also a significant and valuable indicator of aquatic as well as terrestrial ecosystem health and habitat disturbance (Watson *et al.* 1982; Castella 1987; Nair 2011) ^[5-7]. This kind of habitat specificity of species makes them as a tool to assess and monitor the ecosystem health (Kulkarni and Subramanian, 2013) ^[8]. Globally 5,740 species of odonates are known, of this 470 species in 139 genera and 19 families exist in India (Subramanian, 2009) ^[9].

In Hadoti region of Rajasthan, no significant work is carried out on the biodiversity of Odonates. The main objective of the present study was to collect, identify and observe diversity and abundance in four different areas (Karani mata, C.V. Garden, Bhitariya Kund and Yatayat Park) of Kota. *Odonata* occupy almost all kinds of habitats ranging from permanent running waters and lakes to small temporary rain pools (Corbet, 1999) ^[10]. In Kota there is permanent running water of Chambal near Yatayat Park and Bhitariya Kund, man-made wetland like Kishor Sagar Talab near C.V. Garden and Abhedha Talab near Karni Mata.

2. Materials and Methods

2.1 Study area

The district Kota of Rajasthan is located at 25.18°N & 75.83°E and has an average elevation of 271 metres (889 ft). Kota comes under semiarid region with summer temperature 25 °C -42 °C and winter temperature 12 °C -26 °C. Four areas of Kota are surveyed for the study of dragonflies and damselflies namely Karani mata, C.V. Garden, Bhitariya Kund and Yatayat Park. All the four areas have rich vegetation.

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2.2 Sampling and identification of Odonates

The Odonats were surveyed and collected every week from September 2014 to August 2016. All the survey was conducted during the day time between 6.30AM and 6.30PM. Aerial net and Sweep net was used for an insect collection. Some species were photographed, but some were also collected with insect catching nets for the proper identification. Collected and photographed species were identified with the help of standard identification manuals (Nair, 2011 and Subramanian, 2009) [7, 9]. Those specimens difficult to identify in the field, were collected in the paper envelopes and identified in the laboratory with the help of taxonomic keys (Fraser 1933, 1934, 1936) [11-13]. The insects were preserved according to the standard methods. Percent distribution of different species in the survey area was

calculated by the following formula

$$\text{Percent distribution} = \frac{\text{No. of species}}{\text{total no of species}} \times 100$$

3. Results and Discussion

In the present study, odonate insects belonging to 2 families, 11 genera and 12 species (table1) were reported. On the basis of the observations and specimens collected insects were divided into three categories –abundant, occasional and rare. Abundant-which are commonly distributed in the area, Occasional-distributed in some of pockets, Rare- few in number. Out of the 12 species recorded in 4 survey areas 3 species are abundant, 7 species are occasional and 2 species are rare as shown in Table: 2

Table 1: Diversity of Odonats in Kota district of Rajasthan

S. NO	Family	Name	Common Name
1	Libellulidae	<i>Acisoma panorpoides</i> Rambur, 1842	Asian pintail
		<i>Brachythemis contaminata</i> (Fabricius, 1793)	Ditch Jewel
		<i>Crocothemis servilia</i> (Drury, 1770)	Scarlit Skimmer
		<i>Diplacodes trivialis</i> (Rambur, 1842)	Ground Skimmer
		<i>Neurothemis tullia</i> (Drury, 1773)	Pied Paddy Skimmer
		<i>Rhyothemis variegata</i> (Linnaeus, 1763)	Common Picture Wing
		<i>Trithemis festiva</i> (Rambur, 1842)	Black Stream Glider
2	Coenagrionidae	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	Pygmy Wisp
		<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)	Yellow Waxtail
		<i>Ischnura aurora</i> (Brauer, 1865)	Aurora Blue Tail
		<i>Ischnura senegalensis</i> (Rambur, 1842)	Common Blue Tail
		<i>Pseudagrion rubriceps</i> Selys, 1876	Saffron Faced Blue Dark

Table 2: Distribution pattern of dragonflies and damselflies in Kota

Family	Abundant	Occasional	Rare
Libellulidae	√	√√√√√	√
Coenagrionidae	√√	√√	√
Total	3 Species	7 Species	2 Species

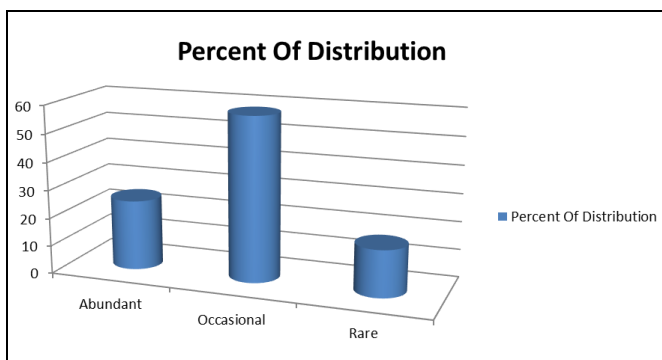


Fig 1: Percent Species distribution of Odonata insects in Kota, Rajasthan

Subramanian [14, 15] Published “checklist of Indian Odonates” and reported that India has moderately diverse fauna of Odonate with 474 species in 142 genera and 18 families. The Suborder Zygoptera comprise of 211 species under 59 genera and 9 families; Anisozygoptera one species under one genera and one family; Anisoptera 276 species under 94 genera and 8 families. Fraser [11-13] dealt in detail with the Odonate fauna of India. From Similipal 16 species of odonates reported under 14 genera and six families by Sethy and Siddiqi [16]. In which libellulidae is well represented followed by coenagrionidae, lestidae, protonneuridae, aeshnidae and calopterygidae. Das et.al. [17] investigated Odonata diversity in Baripada forest division. They reported 58 species of odonata. Sub-order

Zygoptera was represented by 23 species and 35 species represented sub-order Anisoptera. Libellulidae was the richest family with 31 species. Fraser [11-13] also reported (some) species of Odonata from Rajasthan. Agrawal [18] recorded 15 species from Pilani, northern Rajasthan. While, Bose and Mitra [19] reported 13 species distributed over 2 suborders, 4 families and 12 genera from the state. In this study libellulidae family is dominant. Prasad and Thakur [20] listed 16 species from Rajasthan.

Water bodies are required for odonate life cycle and in Kota many water bodies are present with good vegetation around them. Therefore rich vegetation and water availability in the survey area is one of the causes of enriched fauna of dragonflies and damselflies in Kota.

In present investigation 7 species of dragonflies, 5 species of damselflies are reported. 12 species distributed over 2 suborders, 2 families and 11 genera from the sites. Highest number was observed in the Karani Mata followed by C.V. Garden, Bhitariya Kund and Yatayat Park. Kota provides excellent habitat for Odonates,

4. Conclusion

Overall, the study shows the dominance of 3 species in four survey areas of Kota. In all seasons odonates are widely distributed, mostly in monsoon. But in other seasons the distribution not so much affected due to available water sources throughout the year. This might be favouring to dragonflies and damselflies in the survey area because their part of lifecycle is completed through the aquatic environment. Although the member of 2 species were minimum in the present study. Further studies would be necessary in order to get comprehensive information. From the above study, it was concluded that Kota have rich insect fauna, climatic conditions of Kota are suitable for Odonates.

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