

## **Preliminary observations on Odonata fauna of Daroji Sloth Bear Sanctuary, Ballari District, North Karnataka (India)**

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### **ABSTRACT**

The preliminary study was conducted from February 2011 to January 2012 at Daroji Sloth Bear Sanctuary, Hosipt. The study revealed the occurrence of a total of 22 species of Odonates in 19 genera belonging to 5 families from the study area. Among them the order Anisoptera which includes dragonflies was predominated with 17 (76%) species, followed by the order Zygoptera which includes damselflies with 5 (24%) species. The family Libellulidae was found to be the most dominant by 13 species with high percentage composition i.e., 76%, followed by the family Coenagrionidae by 3 species with 40% of total odonates species recorded from the study area. The status based on the frequency of occurrence of shows that 8 (36%) were common, 5 (23%) were very common, 3 (14%) were occasional, 4 (18%) were rare and 2 (9%) were very rare. The study highlights the importance and also provides the baseline information on status and composition of Odonates at Daroji Sloth Bear Sanctuary, Ballari District of North Karnataka for research on their biology and the conservation.

### **KEY WORDS**

Dragonflies; Damselflies; Odonates; Zygoptera; Anisoptera; Deccan Plateau.

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### **INTRODUCTION**

It is generally difficult to evaluate invertebrate faunal diversity as they are often small, cryptic, and seasonal, making even Red List assessments difficult without considerable resources (Samways & Grant, 2007). Odonata is a primitive group of insects, firstly appeared in carboniferous age and popularly known as dragonflies and damselflies (Mitra, 2006). Globally 5952 species of odonates are known from the world, of which 474 species in 142 genera and 18 families exist in India (Subramanian, 2014). Odonate taxa are

ideal models for the investigation of the impact of environmental warming and climate change due to their tropical evolutionary history and adaptations to temperate climates (Nesemann et al., 2011).

Among the invertebrate world, odonates always attract the human beings for their variety of colour, powerful flight and extraordinary sense of vision. The adults are terrestrial and larvae are aquatic. They are valuable as indicators of aquatic and terrestrial ecosystem health and also play a vital role as prey and predator to maintain the balance of trophic levels of food chain and also useful in the

control of harmful insects of crops, orchards and forest, other small insects mosquitoes (Moore, 1997), moths, butterflies and thus have a regulatory impact on agro-forestry (Mitra, 2002).

There are no reports on odonates fauna from this habitat; hence the hitherto study has been conducted to prepare a checklist and to focus on the ecological status of odonates in Daroji Sloth Bear Sanctuary, which might be helpful to improve the habitat and pave the way for future research.

## MATERIAL AND METHODS

### *Study area*

Daraji Sloth Bear Sanctuary is unique sanctuary created exclusively for the preservation of sloth bear situated in Ballari District of North Karnataka. The sanctuary is spread over 82.72 km<sup>2</sup> and located between 15°14' to 15°17'N latitude and 76°31' to 76°40'E longitude at an elevation of 647 meters above mean sea level with the temperature ranged between 20°–43°C. The sanctuary is about 50 km from Ballari and about 15km from the Hampi a renowned world heritage site. It belongs to Deccan Plateau and flora consists of primarily dry deciduous scrub and Southern thorn forests.

### *Sampling methods*

The Odonata sampling was carried out from February 2011 to January 2012. The sampling of Odonata was done by direct counts on hourly basis. Data collection was conducted between 09:00 am and 01:00 pm when insects were most active (i.e., during low wind, warm and sunny weather). The odonates observed in the field were photographed by using digital cameras (Canon 400D, Canon 70D and Panasonic DMC-FZ70) and identified by using field identification keys provided by Subramanian (2009, 2005). The taxonomic and nomenclature is used per Subramanian (2014). On the basis of frequency of sighting and abundance, the odonates were categorized into five groups such as, very common (80–100%), common (60–80%), occasional (40–60%), rare (20–40%) and very rare (below 20%) (Adarsh et al., 2015).

## RESULTS AND DISCUSSION

A total of 21 species of Odonates in 19 genera belonging to 5 families have been reported. During the study, the Order Anisoptera which comprises dragonflies was the predominant with 17 species belonging to three families and contributed 76%, followed by the Order Zygoptera which comprises damselflies with 5 species belonging two families contributed 24% of total odonates recorded (Table 1).

Among the Order Anisoptera, the family Libellulidae was widely distributed and dominated with high percentage composition i.e., 74% (n=12), while the family Aeshnidae and Gomphidae both were equally distributed with percentage composition i.e., 13% (n=2) each respectively (Table 2). Whereas, among the Order Zygoptera, the family Coenagrionidae was dominated with highest percentage composition i.e., 60% (n=3), followed by the family Platycnemididae with 40% (n=2) (Table 2). The status of odonates based on the frequency of occurrence shows that 33% (n=7) were common, 24% (n=5) were very common, 14% (n=3) were occasional, 19% (n=4) were rare and 10% (n=2) were very rare respectively (Table 1). According to IUCN categorization all the odonate species recorded from the study area comes under 'Least Concern' (LC) category (Table 1).

The present investigation revealed that Anisoptera (dragonflies) was found to be abundant, this might be due to their high dispersal ability and adaptability to wide range of habitats (Kadoya et al., 2004; Suhling et al., 2004). This similar pattern of predominance was also reported from other wetlands i.e., from Komaranahalli Lake (Harisha, 2016a), Kondajji Lake (Harisha, 2016b) and Kundavada Lake (Harisha & Hosetti, 2017a) of Davanagere district, and also from Kuvempu University Campus (Harisha & Hosetti, 2017b) of Shivamogga District of Karnataka, Chinnar Wildlife Sanctuary (Adarsh et al., 2015). Less abundance of Zygoptera (damselflies) may be due to their limited dispersal ability and adaptability (Weir, 1974; Williams 1997; Kadoya et al., 2015). The encounter of damselflies could be attributed to the existence of shade over the habitats from the trees around the water bodies and also to the presence of aquatic vegetation, which could favour the Zygoptera more than the Anisoptera (Subramanian, 2005).

SL. NO	ORDER/FAMILY	COMMON NAME	SCIENTIFIC NAME	S
	<b>ANISOPTERA</b>	DRAGONFLIES		
	<b>AESHNIDAE</b>	DARNERS		
1		Parakeet Darner	<i>Gynacantha bayadera</i> Selys, 1891	O
2		Blue Darner	<i>Anax immaculifrons</i> Rambur, 1842	C
	<b>GOMPHIDAE</b>	CLUBTAIL		
3		Common Clubtail	<i>Ictinogomphus rapax</i> (Rambur, 1842)	VC
4		Common Hooktails	<i>Paragomphus lineatus</i> (Selys, 1850)	O
	<b>LIBELLULIDAE</b>	SKIMMERS		
5		Ditch Jewel	<i>Brachythemis contaminata</i> (Fabricius, 1793)	VC
6		Ruddy Marsh Skimmer	<i>Crocothemis servilia</i> (Drury, 1773)	C
7		Granite Ghost	<i>Bradinyoga geminata</i> (Rambur, 1842)	VC
8		Ground Skimmer	<i>Diplacodes trivialis</i> (Rambur, 1842)	VC
9		Green Marsh Hawk	<i>Orthetrum sabina</i> (Drury, 1773)	VC
10		Wandering Glider	<i>Pantala flavescens</i> (Fabricius, 1798)	C
11		Crimson Marsh Glider	<i>Trithemis aurora</i> (Burmeister, 1839)	C
12		Common Picture Wing	<i>Rhyothemis variegata</i> (Linnaeus, 1763)	R
13		Long-legged Marsh Glider	<i>Trithemis pallidinervis</i> (Kirby, 1889)	VR
14		Black Marsh Trotter	<i>Tramea limbata</i> (Desjardins, 1832)	C
15		Red Marsh Trotter	<i>Tramea basilaris</i> (Palisot de Beauvois, 1807)	R
16		Coral-tailed Cloud Wing	<i>Tholymis tillarga</i> (Fabricius, 1798)	R
17		Yellow-tailed Ashy Skimmer	<i>Potamarcha congener</i> (Rambur, 1842)	VR
	<b>ZYGOPTERA</b>	DAMSELFLIES		
	<b>COENAGRIONIDAE</b>	MARSH DART		
18		Pigmy Dartlet	<i>Agriocnemis pygmaea</i> Rambur, 1842	O
19		Golden Dartlet	<i>Ischnura aurora</i> (Brauer, 1865)	C
20		Blue Grass Dartlet	<i>Pseudagrion microcephalum</i> Rambur, 1842	C
	<b>PLATYCNEMIDIDAE</b>	BUSH DART		
21		Blue Bush Dart	<i>Copera vittata</i> Selys, 1863	R
22		Yellow Bush Dart	<i>Copera marginipes</i> (Rambur, 1842)	R

Table 1. Systematic list of odonates recorded at Daroji Sloth Bear Sanctuary, Ballari District, North Karnataka (India).  
VC: Very common; C: Common; O: Occasional, VR: Very Rare; R: Rare.

Sl. No.	ORDER/ FAMILY	Sp.	PO	STATUS				
				VC	O	R	VR	
<b>I</b>	<b>Order ANISOPTERA</b>	<b>17</b>	<b>77%</b>					
1	Family AESHNIDAE	2	12%	1	-	1	-	-
2	Family GOMPHIDAE	2	12%	-	1	1	-	-
3	Family LIBELLULIDAE	13	76%	5	4	-	2	2
<b>II</b>	<b>Order ZYGOPTERA</b>	<b>5</b>	<b>23%</b>					
4	Family COENAGRIONIDAE	2	60%	2	-	1	-	-
5	Family PLATYCNEMIDIDAE	2	40%	-	-	-	2	-
	<b>OVERALL</b>	<b>22</b>	<b>100%</b>	<b>8</b> <b>(36%)</b>	<b>5</b> <b>(23%)</b>	<b>3</b> <b>(14%)</b>	<b>4</b> <b>(18%)</b>	<b>2</b> <b>(9%)</b>

Table 2. Order/Family wise species distribution and composition of odonates at Daroji Sloth Bear Sanctuary, Ballari District, North Karnataka (India). Sp.: Species, PO: Percent occurrence. Status = C: Common, VC: Very common, O: Occasional, R: Rare, VR: Very rare.



Figure 1, 2. Odonates from Daroji Sloth Bear Sanctuary, Ballari District, North Karnataka (India): *Orthetrum sabina* (Fig. 1) and *Pantala flavescens* (Fig. 2).

This abundance of Libellulidae and Coenagrionidae in study area might be due to their shorter life cycle and widespread distribution and ability tolerant to wide range of habitats (Norma-Rashid et al., 2001; Gentry et al., 1975; Samways, 1989). The data recorded in the present study may give valuable information about odonate fauna of Daroji Sloth Bear Sanctuary as a baseline data for assessing the changes of environmental conditions in the area, thereby helping in formulating future conservation measures to preserve the wetland habitats and to maintain the ecosystem health (Krishna Prasad et al., 2013).

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