



ASSESSMENT OF STATUS, DIVERSITY AND THREATS OF ODONATES IN KOMARANAHALLI LAKE, KOMARANAHALLI VILLAGE, HARIHAR TALUK, DAVANAGERE DISTRICT, KARNATAKA, INDIA


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ABSTRACT: The present attempt is to analyze the role of aquatic insects especially Odonates diversity in maintaining the status of the Komaranahalli wetland. The study was conducted from November 2012 to October 2013 during which, a total of 33 species of Odonates belonging to 6 families have been recorded. Among them order-Anisoptera (Dragonflies) was predominant with 24 species, followed by the Zygoptera (damselflies) with 9 species. Among the order-Anisoptera, the family Libellulidae was widely distributed and dominated with high percentage composition followed by the Coenagrionidae among order-Zygoptera i.e., 84%, (n=18) and 67% (n=6) respectively. The status based on the frequency of occurrence shown that 40% were common, 21% were occasional, 18% were very common, 15% were rare and 6% were very rare. The study highlights the importance of odonates and threats in their habitat due to different anthropogenic activities and also provides the baseline data of Odonate diversity of Davanagere District of Karnataka state for research on their biology and the conservation.

Key words: Dragonflies, Damselflies, Threats of Odonates, Zygoptera, Anisoptera, Komaranahalli Lake, Helavankatte

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INTRODUCTION

The Order Odonata, comprising the damselflies (suborder: Zygoptera) and dragonflies (suborder: Anisoptera), are one of the dominant groups of aquatic and terrestrial insects. Odonates, being predators both at larval and adult stages, play a significant role in the wetland ecosystem [1]. Odonates survive in a wide range of aquatic habitats and are susceptible to habitat alterations induced by human activities. Dragonflies have been proposed as indicators to assess the ecosystem health of freshwater wetlands [2]. Odonates serve as an umbrella species in biodiversity conservation [3, 4] and represent specific biotic wetland assemblages.

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 [5]. They are valuable as indicators of aquatic and terrestrial ecosystem health [6] and also play a vital role as prey and predator to maintain the balance of tropic levels of food chain. They are also important and widespread component of freshwater ecosystem, being top predators [7].

The prey of the adults consists mostly of the harmful insects of crops, orchards and forest and thus has a regulatory impact on agro-forestry [8]. They occupy almost all kinds of habitats along the habitat permanent gradient ranging from permanent running waters and lakes to small temporary rain pools [9].

For the first time study was to conduct a preliminary survey on odonate species diversity in selected wetland of Komaranahalli Lake, Davanagere District in order to understand the nature of odonate species assemblages with reference to the habitat characters.

MATERIALS AND METHODS

Study Area

The Komaranahalli Lake belonging to Komaranahalli Village of Harihar Taluk, Davanagere District, is a marvelous site located between latitude of 14°20'1" N and longitude of 75°44'5" E. The lake is about 182 acres, situated adjacent to the famous historical heritage, Helavankatte Sri Ranganatha Swamy temple and besides the state highway road of Harihar-Shimoga and. The lake is situated 20 Km distance from Harihar Taluk and 25 Km from Davanagere City. This wetland provides water for drinking to wildlife from the surrounding Komaranahalli forest as well as to cattle's from the nearby villages, and also for irrigation to surrounding agricultural fields.

Methodology

Odonata sampling was carried out from November 2012 to October 2013. Adult Odonata sampling was done by direct counts made while observing habitats 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). During the course of the survey Odonates were observed in the field and identified by using field guides [10, 11]. The taxonomic and nomenclature that has been used is as per [12]. 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%) based on their abundance during the study period [13].

RESULTS AND DISCUSSION

A total of 33 species of Odonates belonging to 6 families have been reported. During the study, the order-Anisoptera which includes dragonflies was found to be more diverse and predominant with 24 species belonging to 3 families, contributed 73%, followed by the order-Zygoptera which includes damselflies was found to be less diverse with 9 species belonging to 3 families, contributed 27% composition of total odonates recorded from Komaranahalli Lake (Table 1, Figure 1).

Among the order-Anisoptera, on the basis of the family wise species distribution, the family Libellulidae was found to be widely distributed and dominated with high percentage composition i.e., 84% (n=18), whereas, the family Gomphidae and Aeshnidae were found to be more or less equally distributed i.e., 8% (n=2) each respectively (Table 1, Figure 2). However, among the order-Zygoptera, the family Coenagrionidae was found to be dominated with high percentage composition i.e., 67% (n=6), followed by the Platycnemididae with 22% (n=2) and least by the Lestidae with 11% (n=1) of total species recoded from the study area (Table 1, Figure 3).

The status of odonates based on the frequency of occurrence shown that 40% (n=13) species were common, 21% (n=7) were occasional, 18% (n=6) were very common, 15% (n=5) were rare and 6% (n=2) were very rare (Table 1, Figure 4).

During the present investigation, it was revealed that order-Anisoptera (dragonflies) was found to be abundant; this might be due to their high dispersal ability and adaptability to wide range of habitats [14, 15]. Less abundance of Zygoptera (damselflies) was may be due to their limited dispersal ability and changing environment [14,16,17] and partial or absence of shade cover [18] afforded by the temporary water bodies. During the present investigation, the record of abundant Libellulidae (order-Anisoptera) and Coenagrionidae (order-Zygoptera) in study area might be due to their shorter life cycle and widespread distribution and tolerant to wide range of habitats [19, 20, 21]. The study also revealed that the maximum diversity of Odonata in Komaranahalli Lake might be due to their larger size. The size of the water bodies also becomes an important factor to determine the species richness and diversity of Odonata [14, 22, 23].

In wetland habitat the odonates function as good indicators of environment health. In agro-ecosystems they are important bio-control agents helping in controlling insect pest population. However, during the study it has been found that, the odonates and their habitats are under threat due to intensive anthropogenic activities, like, movement of heavy vehicles around the wetland, habitat alterations such as construction of roads, lack of integration in local and regional land use planning, firewood collection, grazing pressure, presence of predators, large scale habitat fragmentation or loss and irreversible damage to their breeding habitats by draining of the swamps, contamination of water bodies, pollution and eutrophication etc., not only affecting the assemblage of Odonata population in temporary water bodies but also cause local extinctions [13, 19, 24, 25].

Table-1: Systematic list of Odonates along with their conservation status at Komaranahalli Lake, Harihar Taluk, Davanager District, Karnataka.

S. No.	Common name	Scientific name	Status	IUCN
Order: Anisoptera (Dragonflies)				
1. Family: Aeshnidae				
1	Blue-tailed Green Darner	<i>Anax guttatus</i>	O	LC
2	Parakeet Darner	<i>Gynacantha bayadera</i>	O	LC
2. Family: Gomphidae				
3	Common Clubtail	<i>Ictinogomphus rapax</i>	VC	LC
4	Common Oartail or Hooktails	<i>Paragomphus lineatus</i>	O	LC
3. Family: Libellulidae				
5	Trumpet Tail	<i>Acisoma panorpoides</i>	C	LC
6	Little Blue Marsh Hawk	<i>Brachydiplax sobrina</i>	C	LC
7	Ditch Jewel	<i>Brachythemis contaminata</i>	VC	LC
8	Ruddy Marsh Skimmer	<i>Crocothemis servilia</i>	C	LC
9	Scarlet Marsh Hawk	<i>Aethriamanta brevipennis</i>	C	LC
10	Granite Ghost	<i>Bradinyopyga geminate</i>	VC	LC
11	Ground Skimmer	<i>Diplacodes trivialis</i>	VC	LC
12	Black-tipped Ground Skimmer	<i>Diplocodes nebulosa</i>	C	LC
13	Pied Paddy Skimmer	<i>Neurothemis tullia</i>	O	LC
14	Brown-backed Red Marsh Hawk	<i>Orthetrum chrysis</i>	VR	LC
15	Blue Marsh Hawk	<i>Orthetrum glaucum</i>	O	LC
16	Crimson-tailed Marsh Hawk	<i>Orthetrum pruinosum</i>	C	LC
17	Green Marsh Hawk	<i>Orthetrum Sabina</i>	VC	LC
18	Wandering Glider	<i>Pantala flavescens</i>	C	LC
19	Common Picture Wing	<i>Rhyothemis variegata</i>	O	LC
20	Crimson Marsh Glider	<i>Trithemis aurora</i>	C	LC
21	Black Stream Skimmer	<i>Trithemis festiva</i>	C	LC
22	Black Marsh Trotter	<i>Tamea limbata</i>	C	LC
23	Red Marsh Trotter	<i>Tamea basilaris</i>	VR	LC
24	Coral-tailed Cloud Wing	<i>Tholymis tillarga</i>	R	LC
Order: Zygoptera (Damselflies)				
4. Family: Coenagrionidae				
25	Pigmy Dartlet	<i>Agriocnemis pygmaea</i>	O	LC
26	Coromandel Marsh Dart	<i>Ceriagrion coromandelianum</i>	C	LC
27	Golden Dartlet	<i>Ischnura aurora</i>	C	LC
28	Senegal Golden Dartlet	<i>Ischnura senegalensis</i>	VC	LC
29	Elegant Sprite	<i>Pseudagrion decorum</i>	R	LC
30	Blue Grass Dartlet	<i>Pseudagrion microcephalum</i>	C	LC
5. Family: Lestidae				
31	Emerald Spreadwing	<i>Lestes elatus</i>	R	LC
6. Family: Platynemididae				
32	Blue Bush Dart	<i>Copera vittata</i>	R	LC
33	Yellow Bush Dart	<i>Copera marginipes</i>	R	LC

VC-Very common; C-Common; O-Occasional, VR-Very Rare and R-Rare, *-Endemic to Western Ghats; **-Endemic to Peninsular India and Sri Lanka

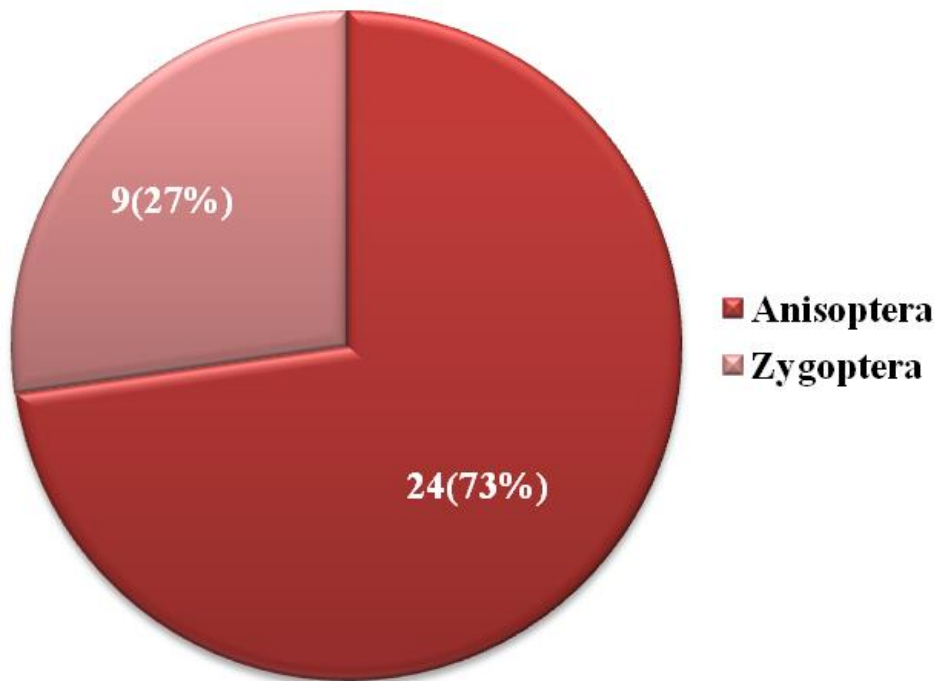


Figure 1. Percentage composition of Odonates (Anisoptera- Dragonflies and Zygoptera-Damselflies) at Komaranahalli Lake

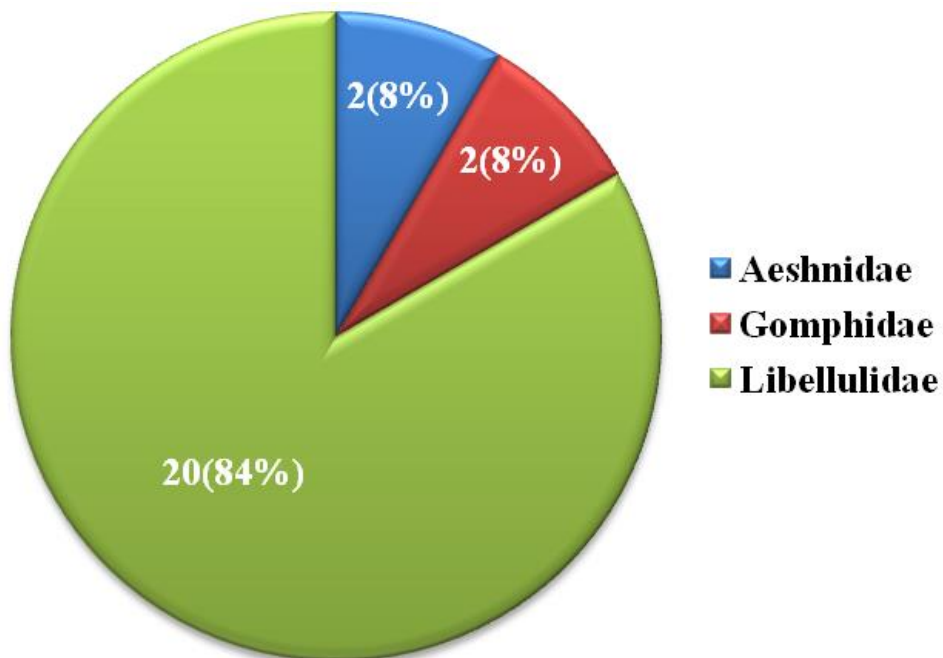


Figure 2: Percentage composition of Dragonflies (Order: Anisoptera) at Komaranahalli Lake

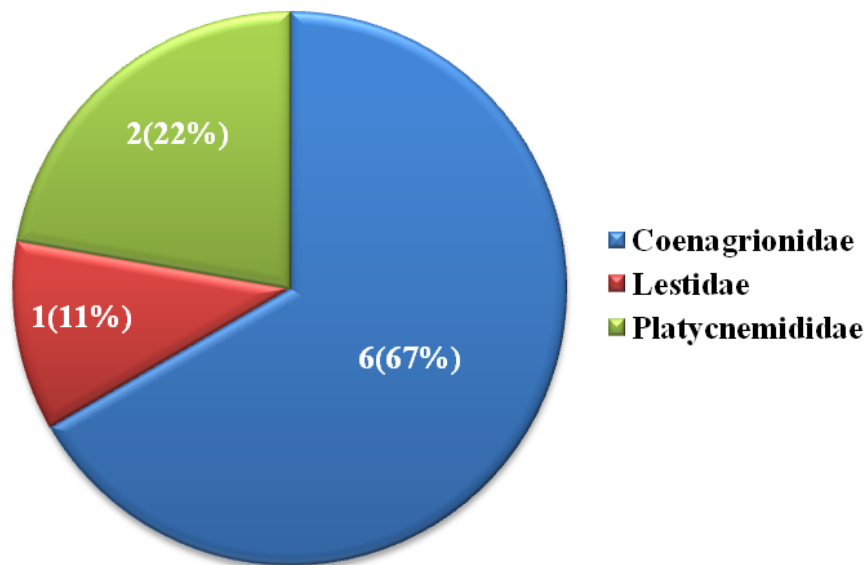


Figure 3: Percentage composition of Damselflies (Order: Zygoptera) at Komaranahalli Lake.

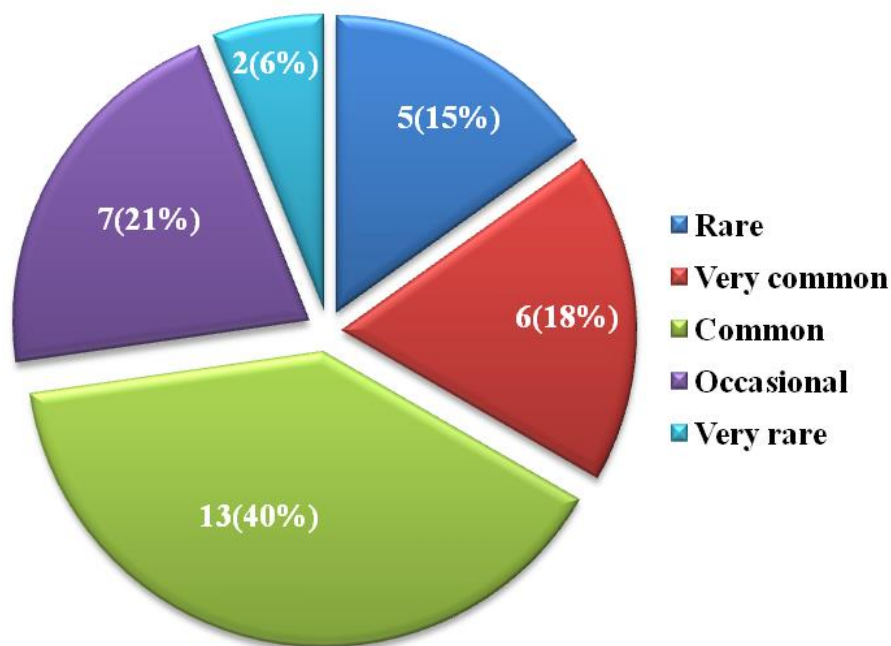


Figure 4: Status of Odonates based on the frequency of occurrence at Komaranahalli Lake.

The data recorded in the present study may give valuable information about odonate fauna of Komaranahalli Lake 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.

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