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Occurrence and relative abundance of dragonflies in Mysuru city, Karnataka, India

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Abstract

A field study was conducted to find out the status, occurrence and relative abundance of dragonflies in Mysuru city, Karnataka during April 2020 to May 2021. Sampling was done by line transect method, collected data from 4 study areas were subjected to estimate relative abundance of species. A total of 28 species under 3 families were recorded. Family Libellulidae was found to be most dominated with 26 species followed by Aeshnidae and Gomphidae with 1 species respectively. Based on the relative abundance 18% of species were very common while, 36% were common and 46% were uncommon. The study revealed occurrence of 5 very common species of dragonflies in all the study areas. The results of this study provide baseline data of dragonfly diversity of Mysuru city for research on their biology and conservation.

Keywords: dragonflies, relative abundance, Libellulidae, Mysuru city, Karnataka

Introduction

Odonates are one of the well-known dominant groups of freshwater and terrestrial insects. The dragonflies (Anisoptera) and damselflies (Zygoptera) belong to order Odonata. Dragonflies are strong fliers, widely distributed and diverse insect group. They are valuable as good indicators of aquatic and terrestrial ecosystem health and play a vital role as prey and predator to maintain the balance of trophic level of food chain^[1,2]. Besides they are also useful in preying harmful insects of crops and aid in control of mosquitoes.

Odonata are often represented as a bioindicator species. They are reflection of fresh water habitats and biotic conditions, the species assemblage of Odonata are influenced by aquatic and terrestrial vegetations. Several studies have noted that the type and structure of water vegetation directly influence the species richness^[3], while studies were also emphasized the influence of climatic factors, habitats and seasonality on occurrence and distribution of dragonflies^[4].

Dragonflies serve as an umbrella species in biodiversity conservation^[5]. In India 499 species of Odonata are known which fall under 139 genera, 18 families and 3 suborders. The Odonata fauna of coastal district of Karnataka was extensively described by Fraser^[6]. Existing literature have documented 83 species of Odonata from state of Karnataka. However it is generally difficult to assess invertebrate diversity as they are often small, seasonal and taxonomical difficulties. Making even Red list assessment difficult without considerable resources of the taxa. The main goal of the present study was therefore to investigate the occurrence and abundance of dragonfly species in Mysuru city. The preliminary study will give an idea of the distribution of different species of dragonflies in respective field areas of Mysuru city, Karnataka.

Material and Methods

The study was carried out in several wetland areas of Mysuru city (12° 18' 26'' N Latitude and 76° 38' 59'' E Longitude at 740msl). Water bodies of Srirampura, Kukkarahalli lake, Lingabudi lake and Ramkrishna Nagar areas were selected for this study purpose. Survey of adult dragonfly species were conducted by line transect method by slowly walking along the edge of the water bodies during 10 am to 1 pm in calm and sunny weather. All study areas were sampled 7 times alternatively between April 2020 to May 2021. Several different dragonfly adults assemblages have been identified with aid of photographs using digital

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camera (Canon EOS 1500D). Most individuals were identified with being captured with a sweep-net from each study areas. Data collected by direct counts during the course of dragonfly species survey in the field were classified and identified with help of field guides [7, 8, 9]. The Relative abundance (%) of dragonfly species is estimated according to Gutzwiller (1991) [10] with following expression of $n/N \times 100$, where 'n' is the number of a particular dragonfly species and

'N' is the total observed for all dragonfly species. Based on the percentage of their relative abundance the dragonfly were categorized into three groups such as very common (having relative abundance above 5%); Common (having relative abundance less than 5% and above 2%); Uncommon (having relative abundance less than 2% and above 0.3%) as per Bisht *et al.* [11].

Table 1: Relative abundance and systematic list of dragonfly species in the study areas of Mysuru city

Sl. No.	Scientific name	Common name	Srirampura	Kukkarahalli lake	Lingabudi lake	Ramkrishna Nagar	Total Number of individuals	Relative abundance (% composition)	Status
1	<i>Pantala flavescens</i>	Wandering glider	23	54	26	19	122	13.65	VC
2	<i>Brachythemis contaminata</i>	Ditch Jewel	19	26	41	32	118	13.20	VC
3	<i>Orthetrum sabina</i>	Green Marsh Hawk	17	19	14	32	82	9.18	VC
4	<i>Crocothemis servilia</i>	Ruddy marsh skimmer	20	11	18	29	78	8.73	VC
5	<i>Neurothemis tullia</i>	Pied paddy skimmer	08	12	17	15	52	5.82	VC
6	<i>Orthetrum luzonicum</i>	Tricolor red marsh hawk	15	05	13	10	43	4.81	C
7	<i>Orthetrum pruinosum</i>	Crimson-tailed marsh hawk	08	11	09	13	41	4.59	C
8	<i>Orthetrum taeniolatum</i>	Taeniolate marsh hawk	10	07	11	12	40	4.48	C
9	<i>Rhyothemis variegata</i>	Common picture wing	06	09	10	13	38	4.26	C
10	<i>Diplacodes nebulosa</i>	Black tipped Ground Skimmer	16	07	04	07	34	3.81	C
11	<i>Acisoma panorpoides</i>	Trumpet-tail	10	02	09	12	33	3.70	C
12	<i>Brachydiplax sobrina</i>	Little blue marsh hawk	08	03	10	12	33	3.70	C
13	<i>Trithemis aurora</i>	Crimson marsh glider	04	01	-	20	25	2.80	C
14	<i>Ictinogomphus rapax</i>	Indian common club tail	04	03	08	05	20	2.24	C
15	<i>Crocothemis servilia</i>	Scarlet skimmer	03	05	07	04	19	2.13	C
16	<i>Tramea limbata</i>	Black marsh Trotter	-	-	07	08	15	1.68	UC
17	<i>Trithemis pallidinervis</i>	Long-legged marsh glider	-	-	04	10	14	1.57	UC
18	<i>Bradynopyga geminata</i>	Granite ghost	-	10	-	02	12	1.35	UC
19	<i>Tholymis tillarga</i>	Coral-Tailed cloudwing	-	-	03	08	11	1.24	UC
20	<i>Potamarcha congener</i>	Yellow tailed Ashy skimmer	02	-	-	08	10	1.12	UC
21	<i>Diplacodes trivialis</i>	Blue ground skimmer	-	-	-	08	08	0.90	UC
22	<i>Trithemis festiva</i>	Black stream glider	-	-	-	08	08	0.90	UC
23	<i>Libellago indica</i>	Southern river Helioder	-	-	02	06	08	0.90	UC
24	<i>Diplacodes lefebvreii</i>	Black ground skimmer	05	-	-	03	08	0.90	UC
25	<i>Indothemis carnatica</i>	Black marsh skimmer	-	-	-	08	08	0.90	UC
26	<i>Rhodothemis rufa</i>	Rufous marsh glider	-	-	05	01	06	0.68	UC
27	<i>Anax indicus</i>	Lesser green Emperor	01	-	01	02	04	0.45	UC
28	<i>Sympetrum orientale selyx</i>	-	-	01	-	03	04	0.45	UC
			179	186	219	310	894		

Note: VC-very common, C-common, UC-uncommon.

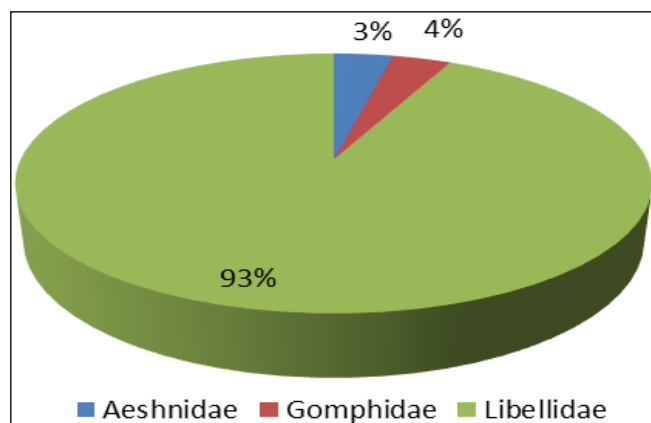


Fig 1: The percentage of species composition under different families

Results and Discussions

A total of 28 species of dragonflies belonging to 3 families were recorded from the four study areas of Mysuru city. On the basis of the family wise species occurrence the family Libellulidae dominated with 93% (n=26) followed by the Aeshnidae with 1% (n=1) and Gomphidae with 1% (n=1) were represented from total collected species (Fig; 1). In the present study it is noticed that family Libellulidae was found to be predominated from other two families. Similar results of abundance were also reported by several odontological studies from India [12, 13, 14].

Among the four study areas, Ramkrishna Nagar area is observed with more dragonfly species, while Srirampura was found to be least. The relative abundance calculated varied among the species recorded. Based on the percentage of relative abundance it was revealed that 5 species of dragonflies were very common with relative abundance of 13.65% to 5.82%, while 10 dragonfly species were common with relative abundance of 4.81% to 2.13%, whereas 13 species were uncommon with relative abundance of 1.68% to 0.48% respectively (Table. 1). In reference to IUCN categorization all the dragonfly species recorded from the study areas comes under Least Concern (LC) category except *Sympetrum orientale selyx* and *Libellago indica*, which are Not Evaluated (NE) their status.

During the present study *Pantala flavescens*, *Brachythemis contaminata*, *Orthetrum sabina*, *Crocothemis servilia* and *Neurothemis tullia* are most common in all the study areas. This could be due to their high dispersal ability and colonization around the lentic habitats. Korkeamaki and Suhonen (2002) [15] concluded that habitat specificity is the most significant factor associated with the distribution of dragonflies. Several occurrence of common species in the present study revealed that aquatic weeds, twigs of tree, amount of sunlight and humid temperature across the water bodies are some factors influence perching and reproduction of dragonflies. However the life history of order odonata is closely linked with water bodies. They use a wide range of aquatic vegetations and stagnant water bodies to complete their life cycle. Dragonflies are highly specific to their habitat for feeding and breeding, some species use specialized habitat for their survival. In the present study the uncommon species which are encountered in one study area were not found in other study areas. This might be attributed to the fact that most of the species of dragonflies are restricted to suitable habitats that which are sensitive to factors such as amount of water and sunlight. During the present investigation the

family Libellulidae represented with several species (n=26). However a single species *Ictinogomphus rapax* and *Anax indicus* was recorded as representative of family Gomphidae and Aeshnidae respectively. Highly restricted distribution of these species could be due to their habitat specificity around aquatic vegetations. Moreover habitat specificity has an important bearing on the distribution and ecology of odonates [16]. Thus the present findings provide information on occurrence and relative abundance of dragonfly species in Mysuru city. The dragonfly species recorded in the study areas may give valuable information for odonata biology and that which are useful in conservation and monitoring wetland health.

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