International Journal of Zoology Studies
www.zoologyjournals.com
ISSN: 2455-7269
Received: 26-01-2026, Accepted: 25-02-2026, Published: 12-03-2026
Volume 11, Issue 1, 2026, Page No. 72-76

Diversity and distribution of Odonata (Dragonflies and Damselflies) in Walayar Lake, Kerala, India

S Selvamurugan*, P Mariappan
Department of Zoology, Rajah Serfoji Government College (Autonomous), Thanjavur, Tamil Nadu, India
Corresponding Author: S Selvamurugan

Abstract
In this study total a 26 species belong to 17 genus and 6 family was recorded at Walayar Lake. The most abundant family of the study is Lebellulidae with 16 species which is followed by Coenagrionidae with 5 species. Family Aeshnidae is represented by 2 species. Gomphidae, Lestidae and Platycnemididae have a single representative species. The Odonates play crucial roles in freshwater ecosystems, their presence indicates good water quality and their diverse species contribute to ecosystem stability. This study helps in planning conservation efforts, habitat management and understanding ecological patterns in the study area.

Keywords: Freshwater ecosystems, biodiversity, dragonflies, damselflies, Odonata, Kerala.

Introduction

Dragonflies and damselflies are the most prominent representatives of the order Odonata contribute a large proportion of invertebrate biomass and species richness [1-3]. They live generally in freshwater habitats and are sensitive and react immediately to any change in the habitat [4]. Odonates are amphibious hemimetabolon insects having the aquatic egg and larval (nymph) stages while the adults are terrestrial.

In many aquatic ecosystems their distribution covers a great deal of continum from temporary to permanent water bodies [5, 6]. In the temperate regions of the world, dragonflies are frequently used as indicators of environmental health. Their aquatic larvae constitute the natural biological control over mosquito larvae and thus help us to control several epidemic diseases like malaria, dengue, filaria *etc*. [7]. In India Odonata status of a given ecosystem give us valuable insight about ecosystem health, especially of wetland. They are among the dominant invertebrate predators in any ecosystem. Being predators both at larval and adult stages, they play a significant role in the food chain [8].

Globally there are 6383 species of odonates in 693 genera with well-developed flying ability and vision. In India, 493 species including 27 subspecies under 154 genera and 18 families are documented [9]. They are one of the fascinating groups of insects. Their amphibious life history, relatively short generation time, high trophic position and diversity made the Odonates an important component of freshwater ecosystems as well as good indicators of ecosystem health [10, 11]. Dragonfly and damselfly are outstanding insects that can be sensitive to aquatic, terrestrial and environmental changes [12, 13]. Odonates are an agronomic significant species and their larva and adults act as a natural biocontrolling agent of coinhabiting insect pest [14]. In India, Odonata status gives a valuable insight about ecosystem health, especially of wetland. They are among the dominant invertebrate predators in any ecosystem [15].

According to Sheldon and Walker [16], Odonata demonstrate their unique habitat preferences through their distribution, which is primarily microhabitats. These insects lay their eggs in or near freshwater. Their high abundance in an area is used as a clear indicator of the freshwater quality [17]. Harinath [18] reported that insects are the largest active order in the animal world, participate a vital role in nutrient cycle, organic matter decomposition, pollination and soil aeration in aquatic ecosystem.

In this background, the present study aims to make an inventory survey on Dragonflies and Damselflies in Walayar lake area. There was no known published data of Dragonflies in this region. It is very important to study the Dragonflies and damselflies diversity of this lake along with their distributions.

Materials and Method

The present study was carried out for a period of two years from January 2020 to December 2021. Specimens of Dragonflies and damselflies were collected and observed in field with careful notes on their habitats. Repeated visits to field have been made in morning, afternoon and evening to collect insects. For diversity and abundance, specimen number of each species has been counted by visual observations. The specimens were identified in the field by using field guides of Subramanian [18] and the Handbook of Common Odonates of Central India by Andrew *et al* [19]. Most specimens were identified in the field by visual observations. The species were also photographed further classification identification of conformation.

Methodology

During the survey standard transect method was used. Different transects of 1 km length was drawn in different parts of the study area and the breadth of each transect was 20 feet. Results were recorded by visualizing the specimens throughout transect and after that summarization of all transects were done.

Table 1: Species list of dragonflies and damselflies found in Walayar Lake, Palakkad, Kerala

S. No	Common name	Scientific name	Genus	Family	IUCN status
1	Black ground skimmer	*Diplacodes lefebvrii*	*Diplacodes*	Libellulidae	LC
2	Common picture wing-female	*Rhyothemis variegata*	*Rhyothemis*	Libellulidae	LC
3	Wandering glider	*Pantala flavescens*	*Pantala*	Libellulidae	LC
4	Ditch jewel	*Brachythemis contaminata*	*Brachythemis*	Libellulidae	LC
5	Black-headed basker	*Aethriamanta brevipennis subsignata*	*Aethriamanta*	Libellulidae	LC
6	Scarlet marsh hawk	*Aethriamanta brevipennis*	*Aethriamanta*	Libellulidae	LC
7	Ground skimmer female	*Diplacodes trivialis*	*Diplacodes*	Libellulidae	LC
8	Common hooktail	*Paragomphus lineatus*	*Paragomphus*	Gomphidae	LC
9	Tramea limbata	*Black marsh trotter*	*Tramea*	Libellulidae	LC
10	Vermilion saddlebags	*Tramea abdominalis*	*Tramea*	Libellulidae	LC
11	Crimson marsh glider	*Trithemis aurora*	*Trithemis*	Libellulidae	LC
12	Ditch jewel	*Brachythemis contaminata*	*Brachythemis*	Libellulidae	LC
13	Ground skimmer Male	*Diplacodes trivialis*	*Diplacodes*	Libellulidae	LC
14	Narrow-lobed glider	*Tramea stenoloba*	*Tramea*	Libellulidae	LC
15	Blue river damsel	*Pseudagrion microcephalum*	*Pseudagrion*	Coenagrionidae	LC
16	The gossamer damselfly	*Ischnura rubilio female*	*Ischnura*	Coenagrionidae	LC
17	Coromandel marsh dart	*Ceriagrion coromandelianum male*	*Ceriagrion*	Coenagrionidae	LC
18	Senegal golden dartlet	*Ischnura senegalensis*	*Ischnura*	Coenagrionidae	LC
19	Red-mantled saddlebags	*Tramea onusta*	*Tramea*	Libellulidae	LC
20	Magnificent emperor male	*Anax immaculifrons*	*Anax*	Aeshnidae	LC
21	Magnificent emperor Female	*Anax immaculifrons*	*Anax*	Aeshnidae	LC
22	Yellow bush dart	*Copera marginipes,*	*Copera*	Platycnemididae	LC
23	Emerald spreadwing	*Lestes elatus*	*Lestes*	Lestidae	LC
24	Long-tailed duskdarter	*Zyxomma petiolatum*	*Zyxomma*	Libellulidae	LC
25	Asian pintail	*Acisoma panorpoides*	*Acisoma*	Libellulidae	LC
26	Brown dartlet male	*Mortonagrion varralli*	*Mortonagrion*	Coenagrionidae	DD

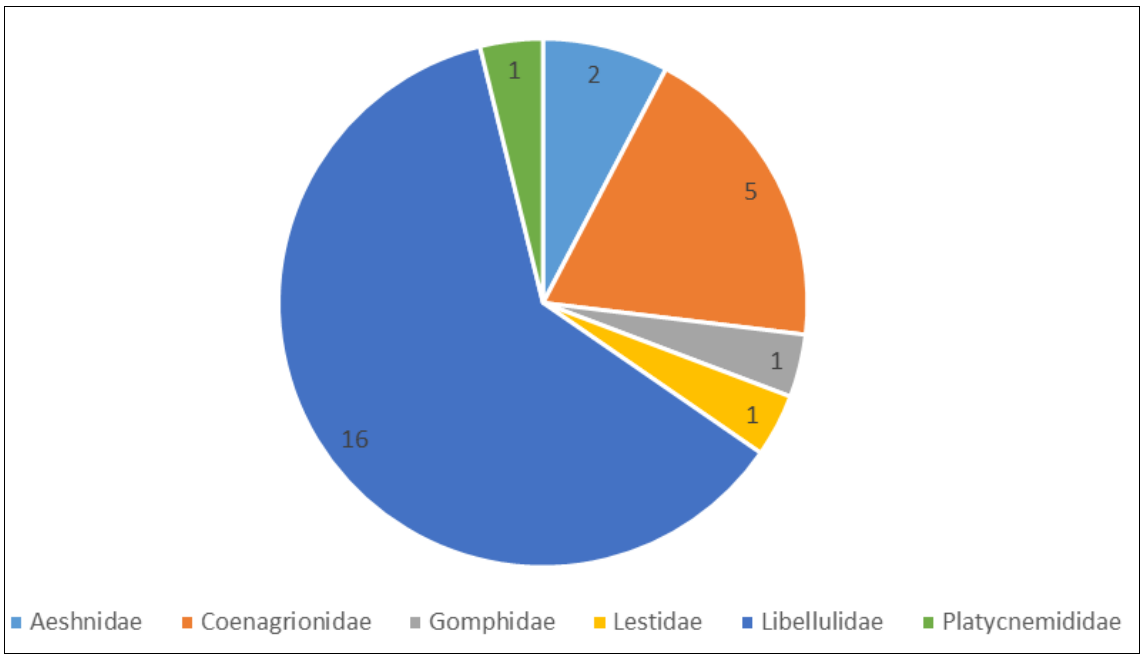

Fig 1: Family wise distribution of dragonflies and damselflies of Walayar Lake

Results

In this study total a 26 species belong to 17 genus and 6 family was recorded at Walayar lake. The most abundant family of the study is Lebellulidae with 16 species which is followed by Coenagrionidae with 5 species. Family Aeshnidae is represented by 2 species. Gomphidae, Lestidae and Platycnemididae have a single representative species (Figure 1). In the study it was found that, the Odonates and their habitats are under slight threat due to anthropogenic activities, like, vehicles are movement in and around the wetland, presence of predators, habitat alterations such as construction and widening of roads, and human settlements in the nearby area.

Trameas (4 species) genus was most the dominate genera compared to *Diplacodes* (3 species) and *Aethriamanta, Anax, Brachythemis, Ischnura* with two species each. The following 11 genus were represented by a single species. They are *Acisoma, Ceriagrion, Copera, Lestes, Mortonagrion, Pantala, Paragomphus, Pseudagrion, Rhyothemis, Trithemis* and *Zyxomma* (Figure 2). Dragonflies and damselflies life history of is closely linked with water bodies. They use a wide range of lotic and lentic water bodies.

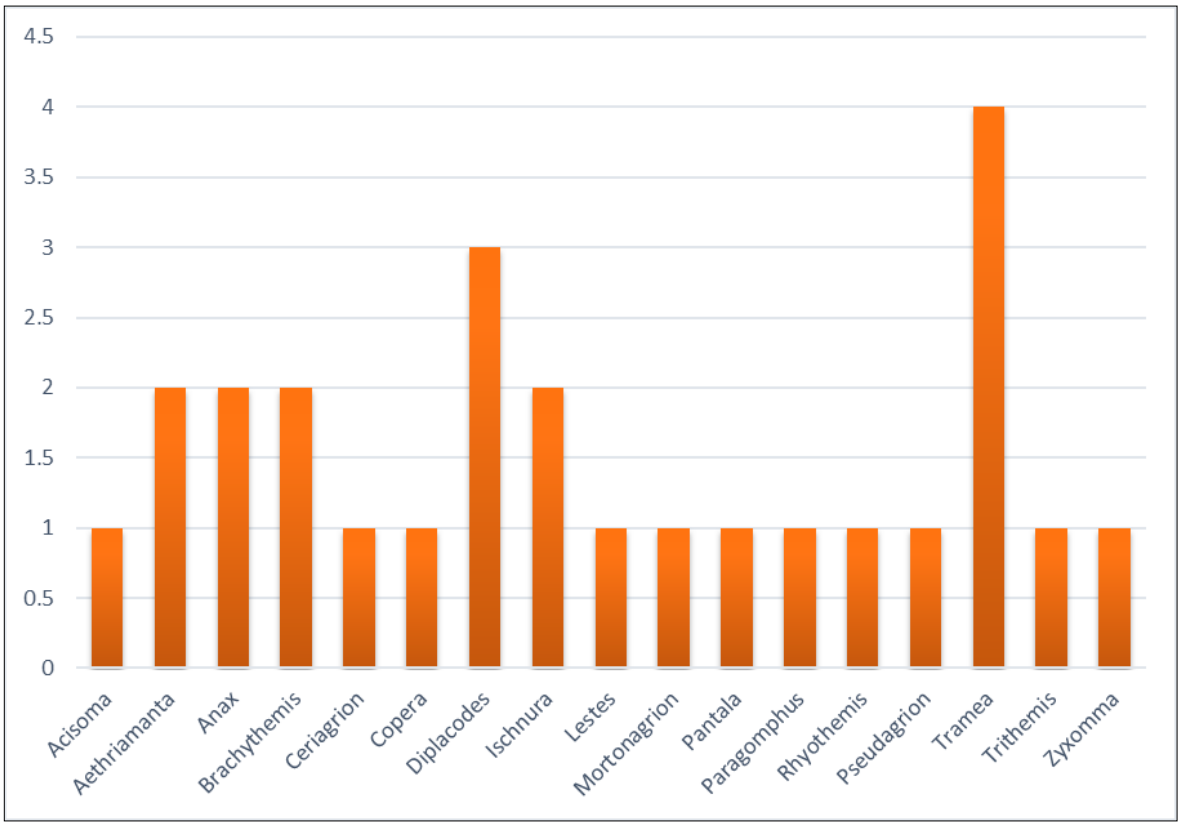

Fig 2: Genus wise status of dragonflies and damselflies of Walayar Lake.

Discussions

The exhibit complex life histories requiring the use of both aquatic habitat as larval period and littoral, riparian and upland areas for adults for maturation, foraging and mating. Diversity studies on these organisms indicate that, the Odonata family Libellulidae was the widespread family and this was in accordance with the observation made by Shelton and Edwards [20]. In the present study also, the Libellulidae family accounts 56.25% of the reported species. It clearly shows that; this family is one of the most prevalent one all over the globe.

Moreover, Libellulidae is a family of dragonflies with many species and belongs to the largest group of Anisoptera. It is also one of the common dragonflies often present in stagnant waters, all types of fresh or slightly brackish water. Although most one of the genera prefer flowing or stagnant waters, most species in stagnant waters are occasionally present inflowing waters. Several research reports the Libellulidae as the dominant family [21-26].

Akbar and Basukriadi [27] showed that Libellulidae is the largest group of dragonflies with more than 1000 species with an approximately 140 genera. They are mostly heliothermic, therefore, depend on direct sunlight for thermoregulation and flight behaviour. The heliothermic species are directly affected by the loss of forest cover and interspecific competition, where they excel in degraded habitats. According to Ilhamdi *et al.*, [28], Libellulidae acts as a predator and consumes all species of aquatic organisms' pests in plantations, and all insects according to their size such as mosquito larvae.

Mitra [7], added nine species in entomofauna record and brought the species account to 48 in Indravati Tiger Reserve Madya Pradesh. Mishra, (2009), reported six new species with existence of 70 species from Achanakmark Amarkantak Biosphere Reserve, Chhattisgarh. In another study 21 species of Odonates were reported from Mundakkottukurussi, Palakkad, Kerala [29]. Singh *et al.*, [30] reported 19 species of Odonates in river Tirthan, Great Himalayan National Park Conservation Area, India. In Lohara Lake, (District-Chandrapur (M.S, India) 12 species were reported by Gain and Kulkarani, [31]. A sum of 18 Odonate species were reported in Lingambudhi lake, Mysuru, Karnataka [32]. A total of 8 species were surveyed at Abheda Mahal of Kota (Rajasthan, India) by Johari *et al.*, [33]. During survey at near Regional Agricultural Research station, Titabar, Assam showed the occurrence of 14 species [34]. In Dipang lake (Nepal) a total of 28 species were collected by Sajan *et al.*, [35].

There were 13 species of Odonates (10 dragonfly species and 3 damselfly species) distributed over 13 genera belonging to three families from four selected sites at the Rankala lake Kolhapur, Maharashtra [36]. In comparative study report a total of 484 specimen were collected and these are grouped into 22 species of Odonates in agro and riparian ecosystem of Malappuram district, Kerala [38]. Twenty species of Odonates found in and around Nagpur Koradi Lake, Nagpur, Maharashtra [38]. In West bengal a total of 47 species were reported from the selected site of Purba district [39]. In a present study a total of 26 species Odonates were recorded from Walayar lake.

Damselfly population was recorded minimum in number when compare to dragonflies. This is in accordance with the earlier studies of Weir [40]. The less occurance of damselflies are is mainly due to their limited dispersal ability. Clark and Samways [11] reported the partial/ absence of shade cover is another factor known its lesser diversity. Prakash and Gunathilagaraj [41] also reported that shade over the habitat facilitates abundance of damselflies and maximum Odonates were observed from the farm pond area. This was in accordance with the studies of Baruah Saikia [42] where

water bodies attract the insects [43]. Asaithambi and Manikavasagam [44] and Bhattacharya *et al*, [45] also reported that *Diplacodes trivialis*, *Pantala flavescens*, *Orthetrum sabina* (Anisoptera), *Ischnura aurora* and *Agriocnemis pygmaea* were the dominant species and observed during various farming activity such as transplanting to harvesting stage of crops in rice field.

In a study by Kalkman *et al*, [46] states that family Libellulidae and Coenagrionidae were represent a large proportion of species diversity in every continent due to their great flight ability and preference of open habitats. The data of present study may be used as a baseline data for assessing the changes of environmental conditions in the area, thereby helping in formulating future conservation measures to preserve the freshwater habitat and to maintain the ecosystem health stably.

Acknowledgements

The authors are thankful to the management of Rajah Serfoji government college Thanjavur. For providing neccery research facilities and DST (Government of India). For FIST Facility.

References

1. Rader RB, Batzer DP, Wissinger SA. Bioassessment and Management of North American Freshwater Wetlands. John Wiley & Sons, 2001.
2. Wittwer T, Sahlen G, Suhling F. Does the abundance of adult dragonflies (Odonata) reflect their larvae? Hydrobiologia,2010:641:233-242.
3. Sang AK. Diversity and ecology of Odonata (Dragonflies and Damselflies) in different habitats,2011.
4. Chovanec A, Waringer J. Ecological integrity of river-floodplain systems—assessment by dragonfly surveys (Insecta: Odonata). Regulated Rivers: Research & Management,2001:17(4-5):493-507.
5. Corbet PS. Dragonflies: Behaviour and Ecology of Odonata. Ithaca, NY: Cornell University Press: 1999. ISBN: 978-0801425929.
6. Johansson F, Suhling F. Behaviour and growth of dragonfly larvae along a permanent to temporary water habitat gradient. Ecological Entomology,2004:29(2):196-202.
7. Mitra. Fauna of Indravathi tiger reserve Madya Pradesh. Zoological Survey of India, Calcutta. Fauna of Conservation Areas,1995:6:1-10.
8. Vashishth N, Joshi PC, Singh A. Diversity and abundance of Odonata (Insecta) in Rajaji National Park. Journal of Nature Conservation,2002:14(2):301-307.
9. Subramanian KA. Dragonflies of India - A Field Guide. Vigyan Prasar, 2009, 1-180.
10. Corbet P. Are Odonata useful as bioindicators? Libellula. 1993:12(3-4):91-102.
11. Clark TE, Samways MJ. Dragonflies (Odonata) as indicators of biotope quality in the Kruger National Park, South Africa. The Journal of Applied Ecology,1996:33(5):1001.
12. Nagy HB, László Z, Szabó F, Szőcs L, Dévai G, Tóthmérész B. Landscape-scale terrestrial factors are also vital in shaping Odonata assemblages of watercourses. Scientific Reports,2019:9(18196):1-8.
13. Bush AA, Nipperess DA, Duursma DE, Theischinger G, Turak E. Continental-scale assessment of risk to the Australian Odonata from climate change. PLoS One,2014:9(2):88958. doi:10.1371/journal.pone.0088958.
14. Khalia A. Potential of dragon flies as bio-control agents of insect pest of rice. In: Kumar A, editor. Current trends in Odonatology. Delhi: Daya Publishing House: 2009. p.1-26.
15. Manwar NA, Wadatkar JS, Varade AM. Diversity and abundance of dragonflies and damselflies (Order-Odonata) of Chatri Lake Region, in Pohara-Malkhed Reserve Forest, Amravati, Maharashtra (India). International Journal of Engineering Research and Applications,2012:2(5):2552-2553.
16. Sheldon F, Walker KF. Spatial distribution of littoral invertebrates in the lower Murray Darling river system, Australia. Marine Freshwater Research. 1998:49:171-182. doi:10.1071/MF96062.
17. Acquah-Lamptey D, Kyerematen R, Owusu EO. Using odonates as markers of the environmental health of water and its land related ecotone. International Journal of Biodiversity and Conservation,2013:5(11):761-769.
18. Harinath P, Suryanarayana K, Venkata Ramana SP. Insect diversity and its co-relation with ecological parameters in and around Wadhwana—a wetland in Central Gujarat. Advances in Bioresearch,2014:5(3):88-97.
19. Subramanian KA. Dragonflies and damselflies of Peninsular India (A Field Guide). IGNCA-BNHS: 2005.
20. Andrew RJ, Subramanian KA, Mitra A. A handbook of common odonates of Central India. Zoological Survey of India, 2009.
21. Shelton MD, Edwards CR. Effects of weeds on the diversity and abundance of insects in soybeans. Environmental Entomology. 1983:12(2):296-299.
22. Dayakrishna, Arya S. An observation on the taxonomic composition, relative abundance and seasonal variation of odonate (dragon flies and damsel flies) fauna of Chaubatia Garden Ranikhet, Almora, Uttrakhand, India. International Journal of Fauna and Biological Studies,2015:2(5):101-106.
23. Siregar YI, Bakti D. Study on diversity of Odonata (Dragonflies and Damselflies) in Sei Mencirim, Deli Serdang District, North Sumatera Province. Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia,2016:2(2):173-177.
24. Tuhin SH, Khan MK. Faunistic study of Odonata (Dragonfly & Damselfly) in some selected regions of Bangladesh. Journal of Entomology and Zoology Studies,2018:6(3):1149-1155.
25. Rohman M, Giyanto, Purnomo. Odonata diversity and abundance in various aquatic ecosystems in the Mount Prau Forest Area, Central Java, Indonesia. IOP Conference Series: Earth and Environmental Science,2020:457(1):012015.
26. Yen NNP, Dawood MAO. Community structure of dragonfly Ordo Odonata in natural forest and tourist sites Petungkriyono forest, Central Java, Indonesia. Journal of Ecological Engineering,2021:22(8):10-19.
27. Noviyana E, Fauzi MA, Riska A. Inventory of dragonfly (Odonata) in freshwater ecosystems of BUMDes Talang Air Mas Village, Seluma Regency. Bioscience,2021:5(2):164-171.

28. Akbar AS, Basukriadi A. Diversity of dragonflies and damselflies in lakes of Universitas Indonesia Depok, West Java. Journal of Physics: Conference Series,2021:1725(1):012035.
29. Ilhamdi ML, Idrus A, Santoso D, Hadiprayitno G. Community structure and diversity of Odonata in Suranadi Natural Park, West Lombok Indonesia. Biodiversitas,2020:21(2):718-723.
30. Chandran A, Jose S. A preliminary study of odonates diversity in Mundakkottukurussi, Palakkad, Kerala. International Journal of Multidisciplinary Education Research,2021:10(4):1-5.
31. Singh AP, De K, Uniyal VP, Sathyakumar S. A preliminary assessment of odonate diversity along the river Tirthan, Great Himalayan National Park Conservation Area, India with reference to the impact of climate change. Journal of Threatened Taxa,2021:13(11):19540-19552.
32. Gain BI, Kulkarni RR. Study on diversity of Odonata (Dragonflies and Damselflies) fauna of Lohara lake, District-Chandrapur (M.S), India. Environment Conservation Journal,2024:25(2):384-387. doi:10.36953/ECJ.26622640.
33. Shreekrupa, Raghunandan H. A preliminary checklist on odonates in and around Lingambudhi lake, Mysuru, Karnataka. International Journal of Entomology Research,2023:8(10):1-4.
34. Johari PR, Jain N. Seasonal variation of odonate diversity in Abheda Mahal, Kota, Rajasthan, India. Bioscience Biotechnology Research Communications,2020:13(3):1429-1432.
35. Saikia R, Mishra H, Devi A, Saikia DK. Biodiversity of odonates in rice eco-system, Titabar, Assam. Journal of Entomology and Zoology Studies,2016:4(6):385-388.
36. Sajan SK, Gurung MM. Records of dragonflies and damselflies (Insecta: Odonata) of Dipang Lake, with two new records to Nepal. Journal of Threatened Taxa,2020:12(8):16013-16021.
37. Gaikwad AR, Shende SS, Kamble KS. Survey of butterfly species diversity and abundance in Phaltan region, district Satara, Maharashtra. Journal of Entomology and Zoology Studies,2015:3(5):32-37.
38. Akshad M, Sreenath AC, Jamsheela O, Jishnu MP. The Odonate fauna (Insecta: Odonata) of agro and riparian ecosystems of Malappuram district, Kerala. International Journal of Entomology Research,2024:9(2):143-147.
39. Sharma P, Kangale M, Agase DM. Study of odonates diversity near Koradi Lake, Koradi, Nagpur, Maharashtra. Journal of Entomology and Zoology Studies,2023:11(1):126-130. doi:10.22271/j.ento.2023.v11.i1b.9134.
40. Mukherjee S, Mandal R. Assessment of diversity of Odonata fauna in selected sites of Purba Barddhaman district, West Bengal, India. Journal of Threatened Taxa,2024:16(2):24775-24785. doi:10.11609/jott.8524.16.2.24775-24785.
41. Weir JS. The population of Odonata in small tropical rivers with reference to asynchronous growth patterns. Hydrobiologia. 1974:45(4):565-584.
42. Arulprakash R, Gunathilagaraj K. Abundance and diversity of Odonata in temporary water bodies of Coimbatore and Salem districts in Tamil Nadu. Journal of Threatened Taxa,2010:2(8):1099-1102.
43. Baruah C, Saikia PK. Abundance and diversity of odonates in different habitats of Barpeta District, Assam, India. International Research Journal of Biological Sciences,2015:4(9):58-67.
44. Krishnasamy N, Chockalingam S, Dash AS. Survey of Odonata in rice fields of Tamil Nadu. Entomon. 1984:9:147-152.
45. Asaithambi M, Manickavasagam S. Odonata of Annamalai University, Annamalai Nagar, Tamil Nadu. Zoos' Print Journal,2002:17:704-706.
46. Bhattacharya B, Basit A, Saikia DK. Parasitoids and predators of rice insect pests of Jorhat district of Assam. Journal of Biological Control,2006:20:37-44.
47. Kalkman VJ, Clausnitzer V, Dijkstra KDB, Orr AG, Paulson DR, Van Tol J. Global biodiversity of dragonflies (Odonata) in freshwater. Hydrobiologia,2008:595:351-363. doi:10.1007/s10750-007-9029-x.