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# Diversity and Seasonal Variation of Odonates in Selected Wetlands of Madurai District

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**ABSTRACT**
This study was conducted in the wetlands of the Madurai district to elucidate the diversity, distribution, and seasonal dynamics of Odonate species. Employing the fixed area transect method and the visual encounter survey method for fieldwork, the research identified 28 Odonate species, consisting of 19 dragonflies and 9 damselflies across five families. The dominant families observed included Libellulidae, Coenagrionidae, and Gomphidae, with the Anisoptera suborder prevailing over Zygoptera. Areas such as Kovil Papakudi and Vandiyur displayed high diversity, while Thenkarai and Avaniyapuram had lower counts, influenced by significant factors such as reduced vegetation cover and pollution. Seasonal variations revealed that the monsoon season showcased the highest diversity, particularly in October, which aligns with the reproductive behaviours of Indian Odonate species. Crucial factors affecting Odonate diversity included temperature, precipitation patterns, declining water levels, and vegetation. Preserving aquatic habitats has emerged as a vital strategy for safeguarding these species. The findings provide valuable insights for conservation efforts and emphasize the need for habitat restoration in the wetland ecosystem of the Madurai district.

**Key words:** Dragonfly, Damselfly, Biodiversity, Seasonal dynamics, Aquatic habitat, Wetland ecosystem

## INTRODUCTION

The order Odonata, which encompasses both damselflies and dragonflies, is a widely recognized and distributed group of insects (Tillyard 1917). These visually striking insects play a prominent role in ecosystems, relying on freshwater habitats throughout their life cycle (Tiple et al. 2013). The larvae thrive in aquatic environments, while the adults inhabit terrestrial areas. Both stages are predatory (Andrew et al. 2008). During the breeding season, adult Odonates are primarily found in proximity to aquatic environments, where they establish and defend territories along the edges of wetlands. They prefer flowing (lotic) and standing (lentic) water bodies for reproduction, with different species exhibiting varied preferences for their specific environments. Given their habitat specificity, Odonates serve as excellent indicators for monitoring the health of freshwater ecosystems (Kumar et al. 2015). Wetlands are vital for conserving freshwater biodiversity as they harbour unique flora and fauna not found in other habitats (Williams 1997). However, these environments are rapidly diminishing due to land use changes, contamination, and eutrophication, severely impacting species such as Odonata that depend on these habitats (Janssen et al. 2018). Owing to their sensitivity to environmental changes, Odonates are regarded as reliable bioindicators of wetland ecosystem health (Kunte 2000).

Odonate aquatic larvae play a crucial role in the ecosystem as biological control agents, preying on mosquito larvae and helping to mitigate the spread of epidemic diseases such as dengue, malaria, and filariasis (Mitra 2002). Globally, 6,335 Odonata species have been documented, distributed across 693 genera (Paulson et al. 2025). In India, 493 species and 27 subspecies belong to 152 genera and 18 families (Subramanian and Babu 2017). Numerous studies have reported the presence of Odonates in various water bodies throughout India (Fraser 1933, 1934, 1936, Kumar 1973, Prasad and Singh 1976, Ram et al. 1982, Kaushik et al. 1990, Prasad 2002, Arulprakash and Gunathilagaraj 2010, Anbalagan and Ishwarya 2024, Mukherjee et al. 2024). However, no research has examined the presence of Odonates in the wetlands of the Madurai District. This study intends to address this knowledge gap by investigating Odonata's seasonal dynamics and

species diversity in the Madurai District. The findings will provide essential baseline information for understanding the area's biodiversity and distribution, which is vital for future research.

## MATERIAL AND METHODS

### Study area

This study was conducted in the Madurai district of Tamil Nadu, India. The district spans latitudes 9°56'' to 9°93'' N and longitudes 78°07'' to 78°12'' E. Madurai is situated on a flat, fertile plain formed by the Vaigai River, which flows from northwest to southeast, effectively dividing the city into two approximately equal sections. The summer season in this region lasts from May to July, with temperatures ranging from 26 to 42°C. In contrast, winter temperatures typically occur from December to February, dropping to around 20°C. Most rainfall is received between October and December during the northeast monsoon period, with an average annual precipitation of 840 mm (Anonymous 2023). The hills of Nagamalai and Sirumalai are located west and north of the city.

### Sampling sites

The selection of sampling sites was guided by two primary criteria: year-round water availability and a minimum size of 50 ha. Ensuring water availability throughout the year is essential for a thorough and long-term ecosystem analysis. Additionally, choosing tanks larger than 50 ha supports the persistence of diverse Odonate communities by offering expansive aquatic habitats. To minimize bias, tanks of comparable sizes were selected for comparison. Based on these criteria, 12 sampling sites were identified: Avaniyapuram, Kovilpapakudi, Koothiyargundu, Kulamangalam, Madakulam, Mettuneethan, Samanatham, Thenkarai (Solavandan), Thenkarai (Thiruparankundram), Thenur, Uthangudi, and Vandiyur (Fig. 1). The geographical locations and descriptions of the study sites are detailed in Table 1.

### Sampling and data collection

The fixed-area transect method and visual encounter surveys (VES) were used to sample Odonata. This process involved an observer walking along the fixed transect lines that marked each water body's

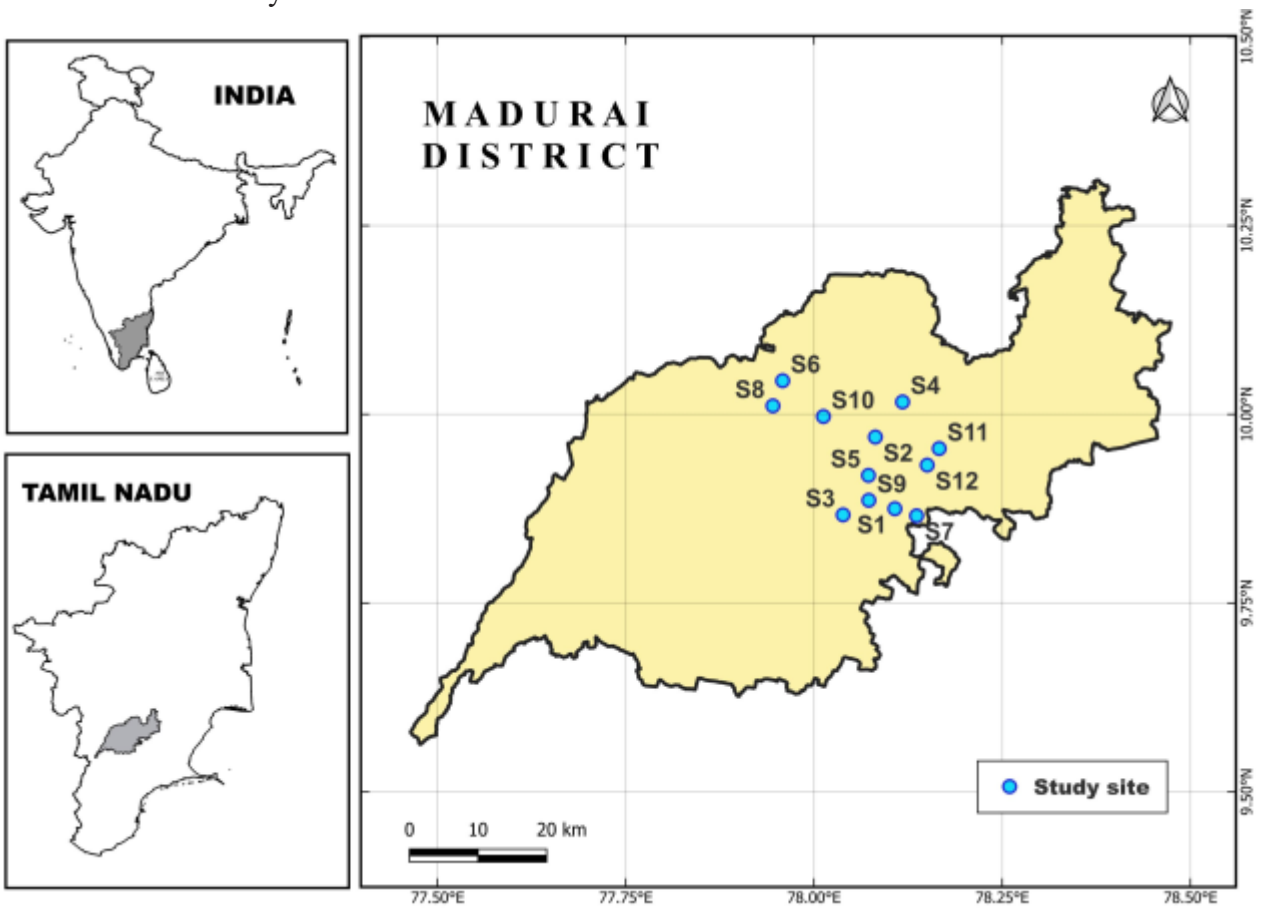


Figure 1. Study area and sampling sites in Madurai district

Table 1. Description of Sampling sites and their ecological characteristics

| Site code | Sampling site | Wetland characteristics and surrounding land use | Latitude (° North) | Longitude (° East) | Tank size (ha) | Shade cover | Aquatic vegetation |
|---|---|---|---|---|---|---|---|
| S1 | Avaniyapuram | Dominated by aquatic macrophytes, primarily *Eichhornia crassipes* (water hyacinth) | 9.874829 | 78.10741 | 50.54 | High | Present |
| S2 | Kovilpapakudi | Located within a village, surrounded by agricultural fields | 9.969896 | 78.08151 | 53.74 | Partial | Absent |
| S3 | Koothiyargundu | Adjacent to rice paddies and bordered by a mountain | 9.866713 | 78.03864 | 176.22 | High | Absent |
| S4 | Kulamangalam | Situated within a village, surrounded by agricultural landscapes. | 10.0164 | 78.11766 | 50 | High | Present |
| S5 | Madakulam | Located on the periphery of the city, bordered by agricultural lands and cultivated fields | 9.919013 | 78.07235 | 134.19 | Partial | Absent |
| S6 | Mettuneethan | Surrounded by open grasslands, scattered small trees, shrubs, and agricultural land | 10.04452 | 77.95835 | 64.36 | High | Present |
| S7 | Samanatham | Characterized by algal growth, bordered by agricultural fields | 9.865441 | 78.13633 | 103.54 | No | Absent |
| S8 | Thenkarai (Solavandan) | Supports wetland-dependent agriculture and is surrounded by mountainous terrain | 10.01119 | 77.94544 | 71.44 | High | Present |
| S9 | Thenkal (Thirupurangundram) | Located near major highways and urban settlements | 9.885982 | 78.07281 | 130.57 | Partial | Absent |
| S10 | Thenur | Composed of wetland-dependent mixed vegetation, interspersed with agricultural fields and other cultivated crops | 9.997085 | 78.01253 | 56 | High | Present |
| S11 | Uthangudi | Situated within an urban area, dominated by wetland-associated vegetation | 9.954679 | 78.16631 | 50.21 | Partial | Absent |
| S12 | Vandiyur | Located within city limits, primarily covered with *Eichhornia crassipes*, with one side bordering Sundaram Park | 9.932668 | 78.1504 | 199.24 | Partial | Present |

perimeter, documenting every Odonata species encountered. Each study location featured two transect lines spanning 500 m, with Odonates observed along these transects being recorded. Field surveys were conducted bi-monthly at each site from July 2022 to June 2023. Visits were scheduled between 10 a.m. to 2 p.m. when Odonates are most active in regulating their body temperature in sunlight. Species were documented through photography using a Canon 1200D camera. A sweeping net was employed to capture species that were difficult to identify in the field, followed by the taking of clear photographs before their release. Species were identified using taxonomic literature (Fraser 1933, 1934, 1936) and field guides (Subramanian 2005). Species names and classifications were based on the works of Kalkman et al. (2020) and Subramanian and Babu (2017, 2019), respectively. Odonate species were categorized into four groups for assessing relative abundance: prevalent (VC) with more than 100 sightings, common (C) with 50-100 sightings, rare (R) with 2-15 sightings, and very rare (VR) with fewer than 2 sightings. The study period was segmented into four seasons: summer (March-May), pre-monsoon (June-August), monsoon (September-November), and winter (December-February).

The Shannon Diversity Index and the Margalef Index were employed to evaluate species diversity within various Odonate communities. The diversity indices were calculated using Past 4.0 software. The Shannon Diversity Index is a well-established metric for assessing species diversity in a specific community, considering the abundance and evenness of different species in a defined area (Shannon 1948). In contrast, the Margalef Index serves as an alternative biodiversity indicator, focusing on the species richness within a given environment (Margalef 1996). Additionally, the evenness index, calculated using the formula e^(H/S), integrates the Shannon Diversity Index with species richness to evaluate the equitable distribution of individuals among various species.

## RESULTS AND DISCUSSION

28 Odonate species were identified in the wetlands of Madurai District, comprising 19 dragonflies and nine damselflies from five families. The family Libellulidae was the most dominant, representing 53% of the Odonates, followed by Coenagrionidae at 32% and Gomphidae at 7%. Both Aeschnidae and Macromiidae contributed 4% each, indicating that only one species was present from these families (Fig. 2). Throughout the wetlands, the suborder Anisoptera was found to be more prevalent than Zygoptera due to their superior dispersal capacity and adaptability; this wide range of habitats contributes to their dominance (Hodgkin and Watson 1958, Batzer and Wissinger 1996). Conversely, damselflies are less common due to their limited dispersal ability (Weir 1974), the fluctuating conditions in aquatic environments, and the partial or absent shade cover in transient water bodies (Kadoya et al. 2004).

Assessing relative abundance revealed that nine species fall into the “very common” category, six are classified as “common,” eleven are deemed “ rare,” and two are considered “very rare” among the 28 Odonata species identified (Table 2). Within the suborder Anisoptera, several species, such as *Brachythemis contaminata, Pantala flavescens*, and *Orthetrum sabina* were ubiquitous across all 12 study sites. In contrast, the order Zygoptera exhibited site-specific occurrences, suggesting distinct environmental influences (Table 2). Odonate species abundance displayed significant variability, while some species were present in large numbers, others were represented by very few individuals (Fig. 3). The species observed in the highest numbers was *B. contaminata*, with 1,213 individuals, followed by *P. flavescens* (692). *B. contaminata*, commonly known as the Ditch Jewel, is typically found at the water’s edge. Its presence indicates pollution, primarily from anthropogenic activities, and it serves as a marker for water bodies that are unsuitable for human consumption (Nair 2011). *P. flavescens* is a seasonal migratory species, with greater populations recorded during the monsoon. Significant swarms have been documented in agricultural fields adjacent to wetlands. Moderately abundant species included *Trithemis pallidinervis* (412), *Diplacodes trivialis* (308), and *O. sabina* (268). These species are widely distributed and exhibit adaptability to various wetland environments. Some Odonate species, such as *Urothemis signata, Paragomphus lineatus,*

Table 2. Relative abundance of Odonates across the sampling sites in Madurai

| Common name | Scientific name | Relative abundance | Sampling stations | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 |
| Asian Pintail/Trumpet Tail | *Acisoma panorpoides* (Rambur 1842) | C | × | √ | √ | × | × | × | × | √ | × | √ | √ | √ |
| Common Picture Wing | *Rhyothemis variegata* (Linnaeus 1763) | VC | × | √ | √ | √ | √ | √ | √ | √ | × | √ | √ | √ |
| Coral Tailed Cloud Wing | *Tholymis tillarga* (Fabricius 1798) | R | × | × | × | × | × | × | √ | × | × | × | × | √ |
| Ditch Jewel | *Brachythemis contaminata* (Fabricius 1793) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Black Marsh Trotter | *Tramea limbata* (Desjardins 1832) | C | × | × | × | √ | √ | × | × | √ | √ | √ | × | × |
| Greater Crimson Glider | *Urothemis signata* (Rambur 1842) | R | × | × | × | × | × | × | × | √ | × | × | × | × |
| Green Marsh Hawk | *Orthetrum sabina* (Drury 1770) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Ground Skimmer | *Diplacodes trivialis* (Rambur 1842) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | × |
| Little Blue Marsh Hawk | *Brachydiplax sobrina* (Rambur 1842) | C | √ | × | × | × | × | × | × | × | × | × | × | √ |
| Long Legged Marsh Glider | *Trithemis pallidinervis* (Kirby 1889) | VC | × | √ | × | × | √ | √ | √ | √ | √ | √ | √ | √ |
| Ruddy Marsh Skimmer | *Crocothemis servilia* (Drury 1770) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Rufous Marsh Glider | *Rhodothemis rufa* (Rambur 1842) | R | × | × | × | × | × | √ | × | × | × | × | × | √ |
| Wandering Glider | *Pantala flavescens* (Fabricius 1798) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Yellow Tailed Ashy Skimmer | *Potamarcha congener* (Rambur 1842) | R | √ | √ | × | × | × | × | × | × | × | × | √ | × |
| Granite Ghost | *Bradinopyga geminata* (Rambur 1842) | R | × | × | × | √ | × | × | × | × | × | × | × | × |
| Common Hook Tail | *Paragomphus lineatus* (Selys 1850) | VR | × | √ | × | × | × | × | × | × | × | × | × | × |
| Common Club Tail | *Ictinogomphus rapax* (Rambur 1842) | VC | × | √ | √ | √ | × | × | √ | × | × | √ | √ | √ |
| Elephan Emperor | *Anax indicus* (Lieftinck 1942) | R | × | √ | × | × | × | × | √ | × | × | × | × | × |
| Common Torrent Hawk | *Epophthalmia vittata* (Burmeister 1839) | R | × | √ | × | × | × | × | × | × | × | × | × | × |
| Coromondel Marsh Dart | *Ceriagrion coromandelianum* (Fabricius 1798) | VC | √ | √ | √ | √ | √ | √ | √ | √ | √ | × | × | √ |
| Golden Dartlet | *Ischnura aurora* (Brauer 1865) | R | × | × | √ | × | × | × | √ | × | × | × | × | √ |
| Pygmy Dartlet | *Agriocnemis pygmaea* (Rambur 1842) | C | × | × | √ | √ | × | √ | √ | √ | √ | √ | √ | √ |
| Sengal Golden Dartlet | *Ischnura senegalensis* (Rambur 1842) | C | √ | √ | √ | × | × | √ | × | √ | × | × | √ | √ |
| Three Lined Sprite | *Pseudagrion decorum* (Rambur 1842) | C | × | × | √ | √ | × | √ | × | × | × | √ | √ | × |
| Azure Dartlet | *Amphiallagma parvum (*Selys 1850) | R | × | × | × | × | × | √ | × | × | × | × | × | × |
| Green Striped Slender Dartlet | *Aciagrion occidentale* (Laidlaw 1919) | R | × | × | × | × | × | × | × | × | × | × | × | √ |
| Saffron-Faced Blue Sprite | *Pseudagrion rubriceps* (Selys 1876) | VR | × | × | √ | × | × | × | × | × | × | × | × | × |
| Western Golden Dartlet | *Ischnura rubilio* (Selys 1850) | R | × | × | √ | × | × | × | × | √ | × | × | × | × |

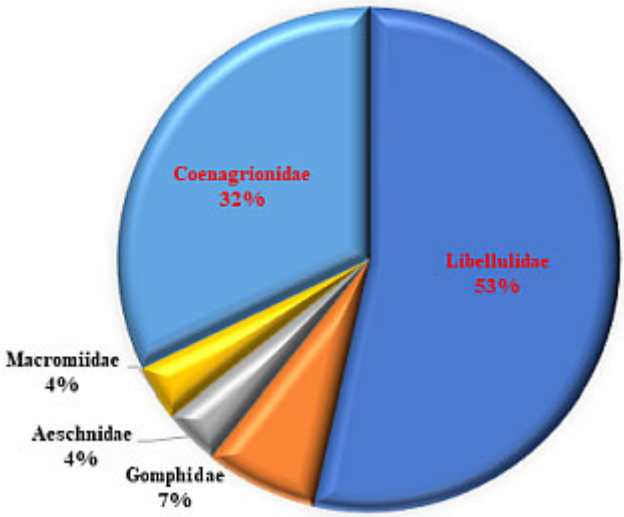


Figure 2. Family wise distribution of Odonates in Madurai District

*Amphiallagma parvum, Aciagrion occidentale, Pseudagrion rubriceps*, and *Ischnura rubilio*, were exclusively observed during specific months from August to October, categorizing them as rare taxa. Additionally, species like *Epophthalmia vittata, P. lineatus, P. rubriceps*, and *I. rubilio* were each recorded only once during the study period. This rarity can be attributed to their sensitivity to environmental and habitat changes and their preference for particular habitats. These findings underscore the importance of habitat conservation in maintaining a diverse Odonate community.

Species richness exhibited significant variation across the study sites, with Kovil Papakudi, Kulamangalam, Mettuneerthan, and Vandiyur showing high levels of richness (Fig. 4). This diversity reflects their unique ecosystems, which provide suitable habitats for Odonates. Vandiyur notably boasts the highest species count of 17, underscoring its ecological richness and environmental suitability. In contrast,

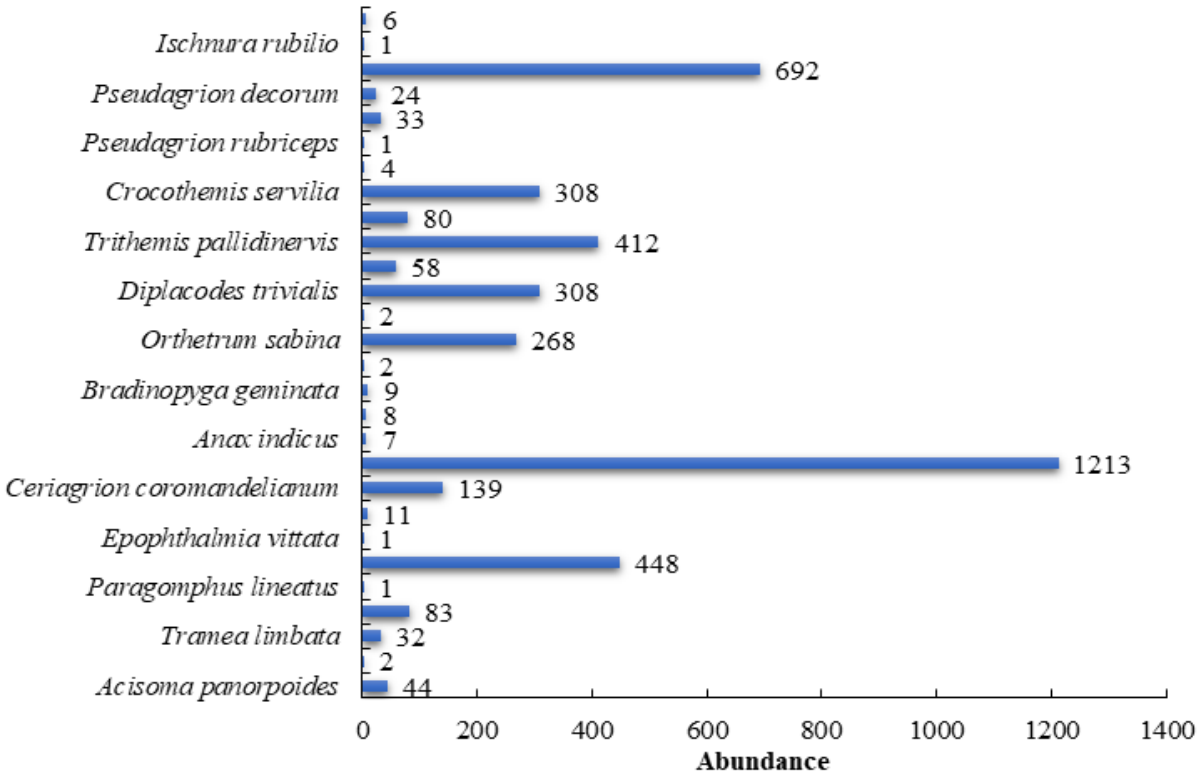


Figure 3. Relative abundance of Odonate species in Madurai District

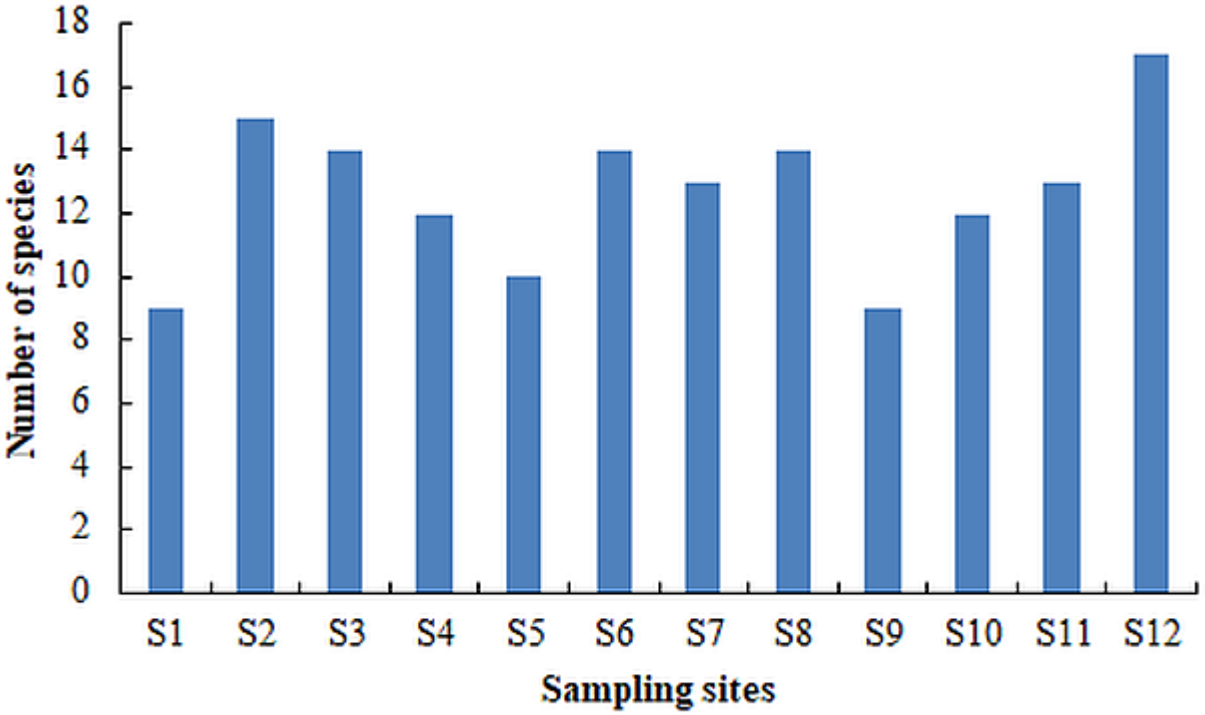


Figure 4. Species richness across the sampling sites in Madurai District. Details of sampling sites as in Table 1

Koothiyarkundu, Madakulam, Samanatham, Thenkarai (S), Thenur, and Uthangudi demonstrate moderate species richness, with counts ranging from 10 to 14. Avaniyapuram and Thenkarai (Thiruparankundram) recorded the lowest species richness, each hosting nine species. These shifts in habitat quality stem from anthropogenic activities, including the dumping of solid waste in wetlands, water contamination due to mixing industrial and household sewage, and a reduction in vegetation cover (Fig. 4). The seasonal variation in species richness for the suborders Anisoptera and Zygoptera was illustrated over four distinct seasons: summer, pre-monsoon, monsoon, and winter, as shown in Figure 5. The monsoon season yielded the highest richness for both Anisoptera (18 species) and Zygoptera (7 species). This trend can be attributed to beneficial factors, such as increased water availability and lush vegetation, which create a more favourable environment for diverse species. Both the pre-monsoon and monsoon seasons exhibited moderate species richness, with 15 Anisoptera species recorded in both seasons, 6 Zygoptera species in winter, and 4 in summer. The lowest richness was noted during the summer, with only 11 species of Anisoptera and 3 species of Zygoptera, attributed to high temperatures and limited water availability restricting species diversity.

Odonate species diversity peaks during the monsoon season, followed by the pre-monsoon, winter, and summer. This observation aligns with the reproductive patterns of most Odonate species in India, which primarily emerge and reproduce during the monsoon season (Subramanian 2005). The primary driver of this phenomenon is the life cycle of Odonata, which is closely associated to aquatic ecosystems due to their nymphal stage and egg-laying habits. The increased water availability during the monsoon positively influences the richness of Odonate species. Conversely, diversity among Odonates declines during the pre-monsoon, summer, and winter, primarily due to reduced water levels. Variations in temperature, water availability, precipitation, vegetation cover, and food resources significantly shape Odonate diversity, impacting their abundance and variety (Kittelson 2004, Goldsmith 2007). The summer season transforms the landscape from the lush green habitat of the monsoon to a drier

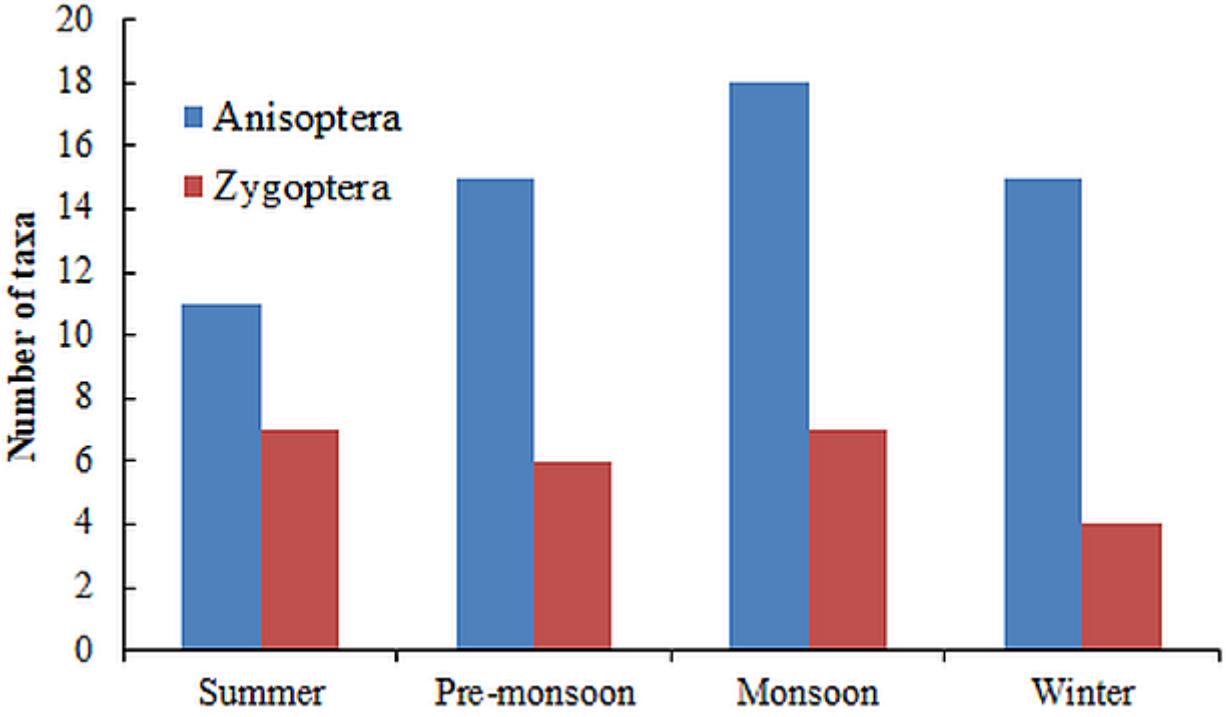


Figure 5. Seasonal variation in species richness of the sub-orders Anisoptera and Zygoptera

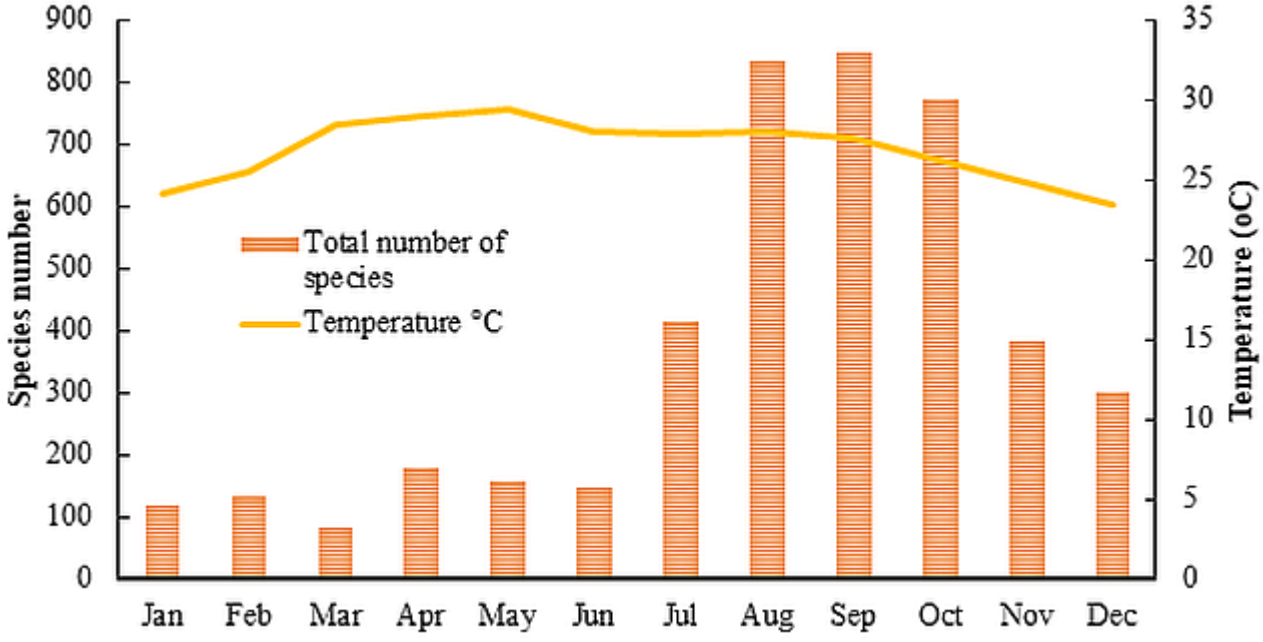


Figure 6. Influence of temperature on the species abundance of Odonanta during the study period

environment, adversely affecting vegetation—an essential factor in determining Odonate diversity. Increased density and diversity of flora during the monsoon subsequently enhance the population of herbivorous insects that depend on these plants. These herbivorous insects serve as the primary food source for Odonates.

The positive relationship between temperature fluctuations and species abundance is depicted in Figure 6. Odonate abundance peaks at temperatures between 26 to 28°C, while lower temperatures correlate with a decline in abundance. Optimal

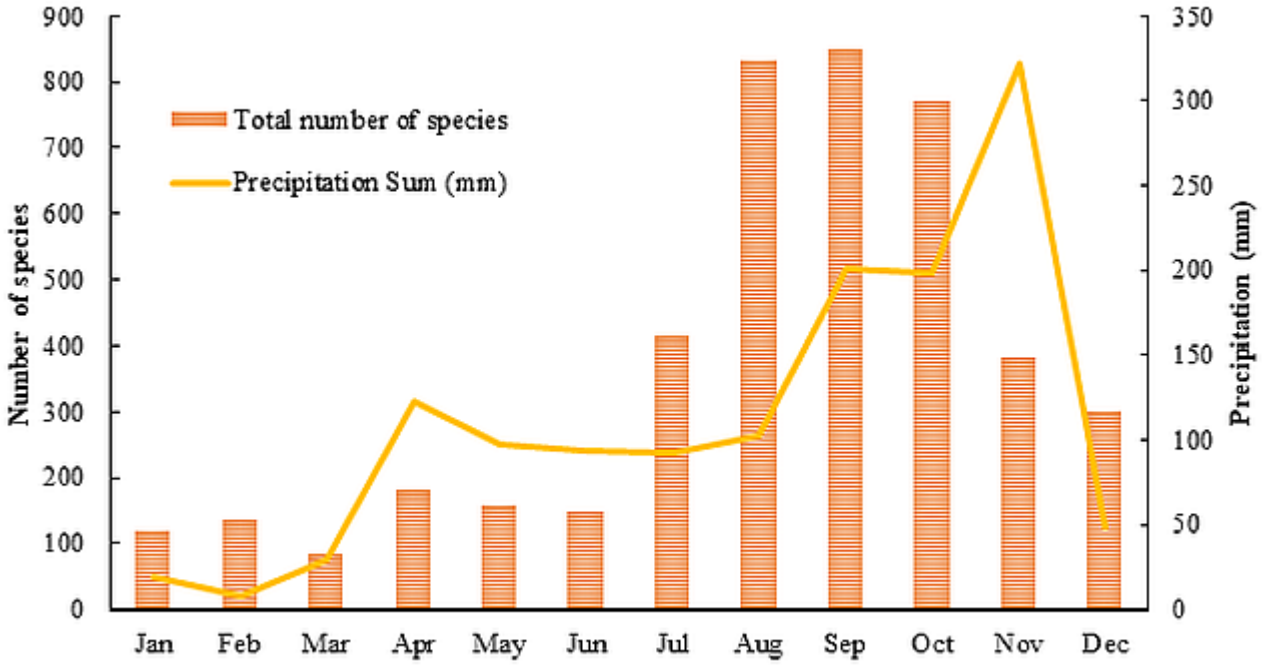


Figure 7. Influence of precipitation on the species abundance of Odonata during the study period

temperatures are essential for their metabolic processes, given that they are thermoregulators, and this also enhances larval growth and development (Corbet 1999). According to Castillo-Pérez et al. (2025), the abundance of Anisoptera rises with increasing temperatures. Figure 7 illustrates a direct positive correlation between precipitation and species abundance. Notably, precipitation reached a high of 322.5 mm in November, yet abundance fell to 381. This reduction in abundance coincided with a drop in temperature to 24°C, highlighting the critical role temperature plays in this context. Similar trends were observed by Castillo-Pérez et al. (2025), who reported declines in both Zygoptera and Anisoptera abundance with excessive rainfall. These findings underscore the significant impact of temperature and precipitation on Odonate diversity. Overall, it is clear that temperature, precipitation, and vegetation cover are the primary factors shaping the seasonality of Odonates.

The species diversity index was calculated for each site to analyze species richness and distribution differences, as shown in Table 3. The Shannon diversity values ranged from 1.56 to 2.33. The analysis revealed that the Kulamangalam site had the highest species diversity value of 2.33, while Avaniyapuram had the lowest value of 1.56. This indicates that the Kulamangalam site supports a more evenly distributed variety of species, allowing for more species to coexist. This site also has microvegetation along the edge of the wetland, which is essential for Zygopteran species. Although Anisoptera was dominant across all study sites, diverse microhabitats contribute to a more balanced species composition at Kulamangalam, resulting in its high Shannon diversity index value. Moderate diversity was noted at several other sites, including Kovil Papakudi, Koothiyargundu, Mettuneethan, Samanatham, Thenkarai (Solavandan), Thenkarai (Thiruparankundram), Thenur, and Uthangudi, according to both the Shannon and Margalef indices. However, both indices indicated exceptionally low diversity in Avaniyapuram. The reduced diversity in this site can be attributed to ecosystem degradation caused by the contamination from solid and liquid waste and invasive species like water hyacinths. The dense mat of water hyacinth that accumulates on the wetland's surface restricts oxygen and light penetration, both crucial for the survival of Odonates and their food sources (Masifwa et al. 2001). These factors negatively impact the quality of the wetland ecosystem, directly contributing to the low diversity value. Additionally, the Margalef index indicates that

Table 3. Odonates diversity index values across sampling sites in Madurai District

| Site code | Sampling site | Shannon_H | Evenness_e^H/S | Margalef |
|---|---|---|---|---|
| S1 | Avaniyapuram | 1.56 | 0.53 | 1.68 |
| S2 | Kovilpapakudi | 2.18 | 0.59 | 2.34 |
| S3 | Koothaiyarkundu | 2.18 | 0.59 | 2.34 |
| S4 | Kulamangalam | 2.33 | 0.73 | 2.38 |
| S5 | Madakulam | 1.66 | 0.53 | 1.29 |
| S6 | Mettuneerthan | 2.2 | 0.64 | 2.26 |
| S7 | Samanatham | 2.02 | 0.58 | 2.37 |
| S8 | Thenkarai (Solavandan) | 1.98 | 0.52 | 2.39 |
| S9 | Thenkarai (Thiruparangundram) | 1.69 | 0.6 | 1.52 |
| S10 | Thenur | 2.01 | 0.62 | 1.81 |
| S11 | Uthangudi | 2.05 | 0.59 | 1.98 |
| S12 | Vandiyur | 2.06 | 0.46 | 2.62 |

Vandiyur has a high species richness value of 2.618, while Madakulam has a lower value of 1.287. This finding suggests that Vandiyur contains many species, enhancing its overall biodiversity. Vandiyur is particularly important as it is one of the largest wetlands among the study sites (Table 1). The wetland's size also significantly influences Odonates' abundance (Kadoya et al. 2004). In contrast, Madakulam exhibits the lowest species richness due to a limited number of distinct species. The primary reason for this is the dominance of certain species, notably *Pantala flavescens* and *Trithemis pallidinervis*. The Kulamangalam site demonstrates a higher evenness index value (0.7348), suggesting a well-balanced distribution of species, with no single species significantly dominating the ecosystem. This outcome underscores the diversity and equitable distribution of species within the area (Table 3). It highlights how habitat quality plays a crucial role in influencing the diversity and dispersion of the Odonate population. Consequently, these insights into Odonata's population dynamics and distribution patterns are vital for assessing the overall health and conservation status of wetland ecosystems. This research will inform future conservation efforts, assisting in prioritizing areas for habitat restoration and protection.

## CONCLUSION

This study provides a comprehensive evaluation of Odonata diversity and seasonal variations in the Madurai district's wetlands, documenting 28 species of dragonflies and damselflies. Seasonal variations significantly influenced species richness and diversity, with the highest numbers observed during the monsoon period. The distribution of Odonate species was closely associated with critical environmental factors such as vegetation cover, rainfall patterns, and temperature. The rare sighting of *Epophthalmia vittata* highlights the ecological importance of these habitats and underscores the need for targeted conservation initiatives. The analysis of biodiversity indices identified key hotspots, particularly in Vandiyur and Kulamangalam, where wetlands support various Odonates. However, these populations face threats from pollution, habitat destruction, diminishing vegetation cover, and the spread of invasive species like water hyacinths. These challenges emphasize the urgent need for conservation efforts and habitat restoration to prevent biodiversity loss and maintain the ecological balance of these wetlands. To develop effective conservation management strategies, future research should focus on long-term monitoring and assessing the impacts of climate change on Odonate diversity.

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**Authors' contributions:** Both the authors contributed equally.

**Conflict of interest:** Authors declare no conflict of interest.

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