

Odonata of Puducherry, Union Territory of Puducherry, India: an updated checklist and distributional insights

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PARMAR, D., PAYRA, A., PARANJPE, A., KHANGAR, S., PATCHAIYAPPAN, A., GANGULY, J. & KOPARDE, P. 2025: *Odonata of Puducherry, Union Territory of Puducherry, India: an updated checklist and distributional insights*. - *Natura Somogyiensis* 46: 37-48.

Abstract: Puducherry, one of the four regions of the Union Territory of Puducherry located along the east coast of India, was surveyed during March, June, and July 2024 to ascertain the present status, diversity, and distribution of odonate species in the region. Surveys were carried out in 27 localities consisting of habitats such as lakes, ponds, rivers, canals, agricultural fields, mangroves, lagoons, sacred groves and tropical dry evergreen forests. The present study documented 30 odonate species under 27 genera and four families, adding 17 new odonate records for the region, increasing the known species count to 31 under 28 genera and five families. The study provides critical baseline data for the future taxonomic and faunistic surveys, as well as it will be valuable for the implementation of conservation strategies to protect these ecologically important insects and their habitats.

Keywords: faunistic, additional records, habitat, lakes, sacred groves

Introduction

The Union Territory of Puducherry comprises four regions, namely Puducherry, Karaikal, Mahe, and Yanam. Puducherry and Karaikal regions are surrounded by the state of Tamil Nadu, whereas Yanam is a coastal enclave within the state of Andhra Pradesh and Mahe is located on the coast of Kerala. Despite having a small geographic area of about 483 km² (about 0.014% of the total geographical area of the country), the Union Territory represents 2.49% of the faunal diversity of the country (RAGHUNATHAN et al. 2023). Out of the four regions, Puducherry with an area of 293 km² is the largest and is characterized by fragmented borders, which encompass a good number of fresh-water lakes and ponds, along with rivers, paddy fields, lagoons, estuaries, mangroves and a 24 km long coastline. The region also supports the distinctive ecosystems of tropical dry evergreen forests, most of whose remnants are protected in the form of sacred groves (CHAMPION & SETH 1968).

According to the 'Faunal Diversity of Puducherry', the Union Territory of Puducherry is home to about 722 species of insects (RAGHUNATHAN et al. 2023), of which,

RAGHUNATHAN et al. (2023) enlisted 87 Lepidoptera; 5 Dermaptera; 34 Hemiptera (Auchenorrhyncha), 88 Heteroptera; 11 Coleoptera (Noteridae, Dytiscidae and Hydrophilidae); 60 Hymenoptera (Chalcidoidea, Evanioidea, Apoidea, Vespoidea); 22 Orthoptera; 14 Odonata; 86 Diptera and 11 Blattodea (Isoptera) species from the Puducherry region. However, information on the Odonata of Puducherry is very scanty with respect to its varied habitat types, such as fresh water lakes, ponds, agricultural fields and rivers. In the first comprehensive checklist of the regions' odonates, EMILYAMMA & RADHAKRISHNAN (2006) reported only 7 species from the district. Hereafter, five species were added to the regions' Odonata list by SUBRAMANIAN et al. (2018). Most recently, BANERJEE (2023) reported an updated account of 14 species from the region, based on the primary and previously published reports (RAGHUNATHAN et al. 2023). The present paper aims to enrich the knowledge of diversity and distribution of odonate species in the Puducherry region district through an intensive survey carried out in 27 localities and by incorporating previously published records.

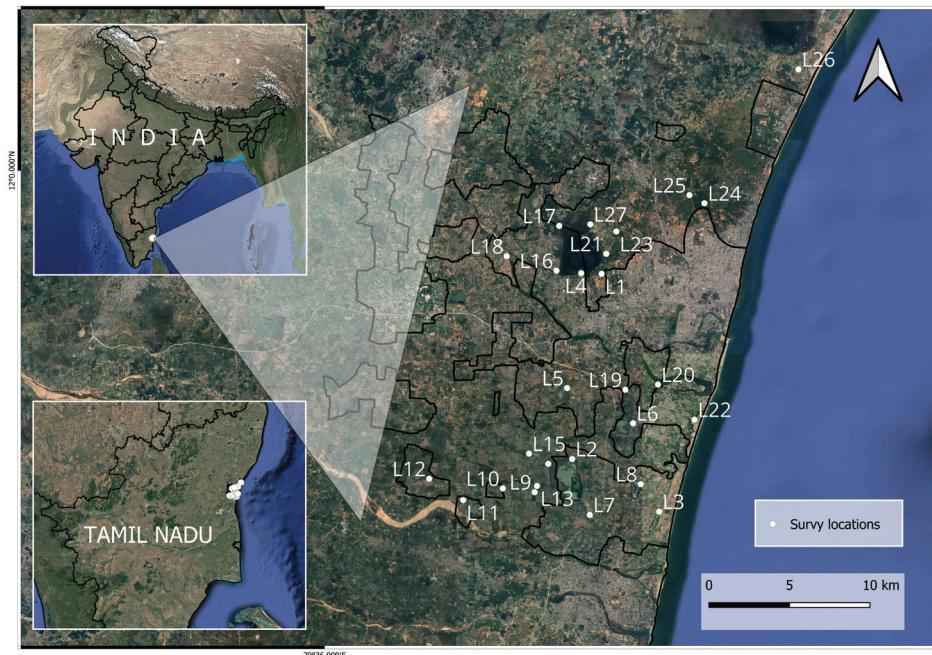


Fig. 1: Map showing the survey localities in Puducherry, Union Territory of Puducherry, India

Material and methods

To understand the Pondicherry's Odonate assemblage, surveys were carried out in two phases of 2024. First, a total of 20 sites (L1-L20) were surveyed for seven days (21 March to 27 March), then 10 (L2, L6, L18, L21-L27) sites (of which 7 sites were new) were monitored in June and July 2024 (details of the survey location provided in Table 1) (Fig. 1). Surveys were carried out chiefly during sunny days, through random walks in different habitat types like ponds, lakes, canals, rivers, agricultural fields, lagoons,

Table 1: List of the sampling localities and habitat characteristics

Loca-tion	Name	Latitude	Longi-tude	Altiti- tude (m)	Habitat Characteristics
L1	Sharanam	11.9412	79.7579	56	Scrubland, Remnant and afforested TDEF vegetation with small water pools
L2	Bahour Lake Era-mudi Ayyanarappan Temple	11.8357	79.7411	45	Lake surrounded by agricultural fields
L3	Near Manapet Road	11.8057	79.7907	38	Pond in the dune slack
L4	Oussudu Lake 1	11.941682	79.7462	41	Lake surrounded by agricultural fields
L5	Korkadu Lake	11.876162	79.7382	39	Lake surrounded by agricultural fields
L6	Abishegapakkam lake south	11.856123	79.7758	38	Lake surrounded by agricultural fields
L7	Manapet lake canal	11.803923	79.7511	39	River canal surrounded by agricultural fields
L8	Pillayarkuppam Lake	11.821412	79.7802	35	Lake surrounded by agricultural fields
L9	Thirupanamapak-kam lake	11.816822	79.7197	42	Lake surrounded by agricultural fields
L10	Kaduvanur lake	11.81895	79.7015	44	Lake surrounded by agricultural fields
L11	Manamedu lake	11.812362	79.6790	43	Lake surrounded by agricultural fields
L12	Karayamputhur lake	11.824473	79.6596	46	Lake surrounded by agricultural fields
L13	Ulleripattu lake	11.820385	79.7210	41	Lake surrounded by agricultural fields
L14	Bahour Lake west-ern bank	11.832988	79.7275	41	Lake surrounded by agricultural fields
L15	Pallipattu lake	11.838793	79.7164	44	Lake surrounded by agricultural fields
L16	Ossudu lake Pathukkannu bridge	11.943057	79.7321	46	Lake surrounded by agricultural fields
L17	Ossudu lake thonda-manatham bank	11.968603	79.7337	44	Lake surrounded by agricultural fields
L18	Gingee River	11.95128	79.7038	34	River course surrounded by agriculture fields and brick clans
L19	Abhishegapakkam lake north	11.875237	79.7714	37	Lake surrounded by agricultural field
L20	Poonjolaikuppam	11.878184	79.7900	33	River course surrounded by agriculture fields
L21	Aurovanam	11.95264	79.7605	46	Afforested TDEF vegetation with remnant patches and dugout ponds

L22	Nallavadu	11.85817	79.81083	30	Lagoon surrounded by dune vegetation and salt marsh
L23	Aranya	11.96538	79.76626	60	Afforested TDEF vegetation intersected by ravines
L24	Forecomers	11.98145	79.81648	62	Mix of Acacia and afforested TDEF vegetation intersected by ravines
L25	Auroville Botanical Garden	11.9861	79.80796	70	Plantation with TDEF vegetation
L26	Puthupet	12.05783	79.87007	38	TDEF surrounded by agricultural field and natural pond
L27	Oussudu Lake 3	11.96944	79.75145	43	Lake surrounded by agricultural field

mangroves, tropical dry evergreen forests. For the ease of identification, Odonate species were photographed in the field, using Nikon P900 and Canon 1200D cameras. Photographic guidebooks of SUBRAMANIAN et al. (2018) and NAIR (2011) were used for identification. For the compilation of the checklist, we used previously published literature by EMILYAMMA & RADHAKRISHNAN (2006), SUBRAMANIAN et al. (2018) and BANERJEE (2023). IUCN status of the species was obtained from the IUCN Red List of the Threatened Species (IUCN 2025). Systematic arrangement of odonate species follows SUBRAMANIAN & BABU (2024).

Results & discussion

The present survey resulted in the record of 30 species (7 species of Zygoptera and 23 species of Anisoptera) under 27 genera and four families (Table 2; Figs. 2-28). Family Libellulidae was found to be speciose with 21 species, followed by Coenagrionidae (7 species), Gomphidae and Macromiidae each with one species.

With the addition of 17 species (*Pseudagrion microcephalum* and *Paracercion melanotum* of Coenagrionidae; *Acisoma panorpoides*, *Aethriamanta brevipennis*, *Brachydiplax sobrina*, *Bradinopyga geminata*, *Diplacodes nebulosa*, *Indothemis carnatica*, *Macrodiplax cora*, *Orthetrum sabina*, *Potamarcha congener*, *Rhodothemis rufa*, *Tholymis tillarga*, *Tramea limbata*, *Trithemis aurora* and *Urothemis signata* of Libellulidae; *Epophthalmia vittata* of Macromiidae) the total number of odonate species in the Puducherry district increases to 31 (Libellulidae: 21, Coenagrionidae: 7, Aeshnidae: 1; Gomphidae: 1; Macromiidae: 1). Only one species (*Anax ephippiger*) was reported earlier by SUBRAMANIAN et al. (2018), but was not observed during the present survey. 7 odonate species were exclusively recorded from one locality. *Paracercion melanotum* from L17; *Aethriamanta brevipennis* from L3; *Indothemis carnatica* from L21; *Macrodiplax cora* from L22; *Tramea limbata* from L1; *Trithemis aurora* and *Zyxomma petiolatum* from L24.

As per the IUCN Red List of Threatened Species none of the recorded species were threatened. Of the enlisted 31 species 29 species were classified as 'Least Concern' and the status of the remaining two species was 'Not evaluated' (IUCN 2025).

Site-wise species richness varies between 1 and 17. The highest was observed in L1 (17 species) and the lowest in L25 (1 species). Among the 27 sites, species richness between 10 and 17 was observed in 12 locations (L2, L18, L6, L17, L14, L26, L19, L1,



Figs. 2-7: Photographic records of odonate species in Puducherry, Union Territory of Puducherry, India. 2 – *Agriocnemis pygmaea*, 3 – *Ceriagrion coromandelianum*, 4 – *Ischnura rubilio*, 5 – *Ischnura senegalensis*, 6 – *Pseudagrion microcephalum*, 7 – *Ictinogomphus rapax*
(Photos: Parmar, D., Paranjpe, A.)

L12, L21, L27, L8) and between 1 and 9 was observed in rest of the 15 locations (L5, L7, L13, L16, L11, L24, L3, L9, L20, L15, L10, L22, L23, L4, L25). The result of low species richness in these 15 locations may be caused by the low sampling effort, rather than the true species richness. As habitat of most of these sites were lakes and river courses surrounded by agricultural fields. However, in case of some of the sites (L24, L23, L25), low number of species can be inferred to the absence of freshwater aquatic bodies in the plantation or afforested area with TDEF vegetation.

Odonates are depended to freshwater environments, are declining all over the world mainly due to the degradation and loss of natural habitats coupled with climate change



Figs. 8-13: Photographic records of odonate species in Puducherry, Union Territory of Puducherry, India. 8 – *Acisoma panorpoides*, 9 – *Aethriamanta brevipennis*, 10 – *Brachydiplax sobrina*, 11 – *Brachythemis contaminata*, 12 – *Bradinopyga geminata*, 13 – *Crocothemis servilia* (Photos: Parmar, D., Paranjpe, A., Gund, S.)

(ADU et al. 2019). Anthropogenic activities, in the form of urbanization, deforestation, intensive agriculture, overgrazing, pollution, and others, are the key reasons for the loss and degradation of residual habitat odonates (SAMWAYS 2008). In the Pondicherry district, growing urbanization along with the uncontrolled tourism and pollution (discharge of domestic and industrial effluents into rivers and lakes) are the major threats that put serious pressure on freshwater environments and biota (BALACHANDRAN et al. 2009; BANERJEE 2023). Thus, it is the need of the hour to implement a proper management plan to safeguard the habitats of these insects vital to ecosystem functioning.



Figs. 14-19: Photographic records of odonate species in Puducherry, Union Territory of Puducherry, India. 14 – *Diplacodes nebulosa*, 15 – *Diplacodes trivialis*, 16 – *Indothemis carnatica*, 17 – *Macrodiplax cora*, 18 – *Orthetrum sabina*, 19 – *Pantala flavescens*

(Photos: Parmar, D., Paranjpe, A., Patchaiyappan, A.)

Acknowledgements

The authors are grateful to Raghunath T.P. and all the members of Svarnir Puducherry, Sri Aurobindo Society, for their support and encouragement to carry out the survey. Authors are also thankful to Inshiya Vohra and Shrikant Gund for their assistance during fieldwork.



Figs. 20-25: Photographic records of odonate species in Puducherry, Union Territory of Puducherry, India. 20 – *Potamarcha congener*, 21 – *Rhyothemis variegata*, 22 – *Rhodothemis rufa*, 23 – *Tholymis tillarga*, 24 – *Trithemis aurora*, 25 – *Trithemis pallidinervis*

(Photos: Parmar, D., Paranjpe, A., Patchaiyappan, A.)



Figs. 26-28: Photographic records of odonate species in Puducherry, Union Territory of Puducherry, India. 26 – *Urothemis signata*, 27 – *Zyxomma petiolatum*, 28 – *Epophthalmia vittata* (Photos: D. Parmar, D., Paranjpe, A., Patchaiyappan, A. K., Gund, S.)

Table 2: An updated checklist of Odonata species of Puducherry region, Union territory of Puducherry, India. (*-new record for the region)

Sl.No	Species	Localities	References	IUCN Status
	Family: Coenagrionidae Kirby, 1890			
1.	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	L1, L3, L5, L6, L8, L13, L14, L25, L26	EMILYAMMA & RADHAKRISHNAN 2006; BANERJEE 2023	LC
2.	<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)	L1-L3, L5-L8, L10-L14, L16-L22, L24, L26, L27	EMILYAMMA & RADHAKRISHNAN 2006; BANERJEE 2023	LC
3.	<i>Ischnura rubilio</i> Selys, 1876	L1, L2, L13	EMILYAMMA & RADHAKRISHNAN 2006	NE
4.	<i>Ischnura senegalensis</i> (Rambur, 1842)	L1, L2, L7-L9, L13, L14-L21, L24, L26, L27	EMILYAMMA & RADHAKRISHNAN 2006	LC
5.	<i>Pseudagrion decorum</i> (Rambur, 1842)	L9, L11-L14, L17-L19	BANERJEE 2023	LC

6.	<i>Pseudagrion microcephalum</i> (Rambur, 1842) *	L6, L7, L9, L13-L15, L17, L19-L21, L23		LC
7.	<i>Paracercion melanotum</i> (Selys, 1876) *	L17		NE
	Family: Aeshnidae Leach, 1815			
8.	<i>Anax ephippiger</i> (Burmeister, 1839)		SUBRAMANIAN et al. 2018	LC
	Family: Gomphidae Rambur, 1842			
9.	<i>Ictinogomphus rapax</i> (Rambur, 1842)	L4, L6, L16-L18, L21, L24, L26, L27	SUBRAMANIAN et al. 2018	LC
	Family: Libellulidae Leach, 1815			
10.	<i>Acisoma panorpoides</i> Rambur, 1842	L2, L3, L5, L8, L11, L12, L16-L19, L26, L27		LC
11.	<i>Aethriamanta brevipennis</i> (Rambur, 1842) *	L3		LC
12.	<i>Brachydiplex sobrina</i> (Rambur, 1842) *	L3, L5, L8, L16, L19		LC
13.	<i>Brachythemis contaminata</i> (Fabricius, 1793)	L1, L2, L4-L21, L26, L27	EMILYAMMA & RADHAKRISHNAN 2006	LC
14.	<i>Bradinopyga geminata</i> (Rambur, 1842) *	L1, L24, L27		LC
15.	<i>Crocothemis servilia</i> (Drury, 1770)	L2, L3, L6-L9, L11, L12, L14-L18, L26, L27	BANERJEE 2023	LC
16.	<i>Diplacodes nebulosa</i> (Fabricius, 1793) *	L18, L26		LC
17.	<i>Diplacodes trivialis</i> (Rambur, 1842)	L1, L2, L5-L7, L10-L12, L14, L15, L17, L18, L21, L22, L23	EMILYAMMA & RADHAKRISHNAN 2006	LC
18.	<i>Indothemis carnatica</i> (Fabricius, 1798) *	L21		LC
19.	<i>Macrodiplex cora</i> (Brauer, 1867) *	L22		LC
20.	<i>Orthetrum sabina</i> (Drury, 1770) *	L2, L6, L7, L10-L14, L17-L20, L21, L26, L27		LC
21.	<i>Pantala flavescens</i> (Fabricius, 1798)	L1, L2, L5, L7, L11, L12, L14, L18, L19, L22, L24, L26	SUBRAMANIAN et al. 2018	LC
22.	<i>Potamarcha congener</i> (Rambur, 1842) *	L1, L6, L12, L18, L21		LC

23.	<i>Rhyothemis variegata</i> (Linnaeus, 1763)	L1, L2, L5-L9, L12, L14, L16-L20, L21, L22, L23, L24, L26, L27	BANERJEE 2023; EMILYAMMA & RADHAKRISHNAN 2006	LC
24.	<i>Rhodothemis rufa</i> (Rambur, 1842) *	L8, L19, L26		LC
25.	<i>Tholymis tillarga</i> (Fabricius, 1798) *	L12, L14		LC
26.	<i>Tramea limbata</i> (Desjardins, 1832) *	L1		LC
27.	<i>Trithemis aurora</i> (Burmeister, 1839) *	L24		LC
28.	<i>Trithemis pallidinervis</i> (Kirby, 1889)	L9, L12, L15, L17, L18, L21	SUBRAMANIAN et al. 2018	LC
29.	<i>Urothemis signata</i> (Rambur, 1842) *	L2, L3, L5, L8, L14, L16, L18-L20, L26, L27		LC
30.	<i>Zyxomma petiolatum</i> Rambur, 1842	L24	SUBRAMANIAN et al. 2018	LC
	Family: Macromiidae Needham, 1903			
31.	<i>Epophthalmia vittata</i> Burmeister, 1839*	L17, L27		LC

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