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### **New Additions to the Odonate Fauna of Thrissur District, Kerala With Their Ecological Notes**

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#### **ABSTRACT**

Thrissur district encompasses the central region of Kerala state, with its cross section including a variety of ecosystems such as forest lands, plain lands, kole wetlands and seashore ecosystems comprising a rich diversity of Odonate fauna. Odonates from different habitats of Thrissur District were observed from January 2017 to August 2018. Selected habitats include forested landscapes, plains, paddy fields etc. A total of 60 species of odonates could be encountered during the present study. Out of these , 16 are newly recorded from Thrissur district. *Paracercioncalamorum*, which is rarely found in Kerala has been recorded from Poomala dam reservoir, perching on lotus leaves. *Onychothemistestacea*, *Aciagrionoccidentale*, *Agriocnemissplendidissima*, *Pseudagrion decorum*, *Pseudagrionmalabaricum* and *Protostictagravelyi* are the other rarely found odonates which is newly recorded by the present study from Thrissur district. As a result of the present study, the number of odonates from Thrissur district reaches 70 from the existing 54. This makes 45% of the total diversity of Kerala.

**KEYWORDS:** Kole wetlands, *Paracercioncalamorum*, *Onychothemistestacea*, *Protostictagravelyi*.

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## **INTRODUCTION**

Odonata is the order of dragonflies and damselflies and it is one of the ancient orders of insects. About 6000 species of Odonates are found all over the world. Odonata fauna of India was revealed first through Fraser(1933,1934 and 1936).Subramanian(2009) has made a checklist of 473 species of odonates of India.

A lot of studies and surveys on odonate fauna have been conducted in Kerala also. Peters (1981) reported 26 species of Odonates from Thiruvananthapuram district. An addition of 17 species to this record was done by Emiliyamma & Radhakrishnan (2002). Mathavan & Miller(1989) recorded 36 species of odonates from Periyar National Park. From the Parambikulam Wildlife Sanctuary 25 species were recorded (Emiliyamma & Radhakrishnan 2000). A record of 31 species of odonata from Kottayam district was presented(Emiliyamma ,2005).Odonate diversity of Kerala was well documented by Kiran & Raju (2013) and prepared a checklist of 154 species of Odonates. Odonates of Southern Western ghats were studied and 169 species of odonates were reported. (Emiliyamma, 2014).A total of 82species were recorded from Salim Ali Bird Sanctuary, Thattekkad (Varghese et. al. 2014). Odonate diversity of Kerala Agricultural University campus, Thrissur was well documented Adarsh et. al. (2014) and 52 species of odonates were recorded. Odonate diversity of Chinnar wildlife sanctuary was recorded as 48 species (Adarsh et. al. 2015). Dragonfly diversity of Irinjalakkuda was studied by Gigi et. al. (2016) and reported 12 species of dragonflies. 36 species of Odonates were reported from a riparian ecosystem, Meenachilriver basin, Kottayam (Vincy et. al.,2016). 68 species of odonates were reported from Varadoor, Kannur (Nair, 2017).

### ***Study area***

The study was conducted in different habitats of Thrissur district, situated in the central Kerala (10.52<sup>0</sup>N – 76.21<sup>0</sup>E). This district spans an area of 3032Km<sup>2</sup>. The land of Thrissur district slopes down from the Western ghats to Arabian sea. The habitats such as forested landscapes, mountain streams, inland waterbodies, paddy fields and marshes etc are selected for the survey. The period of observation was from January 2017 to July 2018. This period of observation includes pre monsoon, monsoon and post monsoon season.

## **MATERIALS AND METHODS**

The Odonate survey was conducted in different localities of Thrissur district such as Kodungallur,Valappad, Mala, Chalakkudy, Nelloy, Mannamangalam, Marottichal, Athirappilly, Kanimangalam, Valiyalukkal, Nedupuzha,Kodannur,Manakkodi, Alappad, Thrissur, Poomala,Peechi,Wadakkancherry, Kunnamkulam.

Field observations were done between 9 am and 1 pm when the odonates are more active. Odonates were caught using insect net, identified with the help of photographic field guides (Kiran & Raju, 2013; Subramanian, 2009) and released to conserve biodiversity.

### **1. *Onychthemistestacea* (Laidlaw, 1902)**

Description: Male: Black and yellow face with green eyes. Thorax is dark metallic green with yellow stripes. Black legs and transparent wings. Black and stout abdomen having yellow spots dorsally and laterally.

Female: Similar to male.

Ecological notes: Major habitats are forested streams. It is a fast flying dragonfly, chases other odonates aggressively. During the present study, it was located at Athirappilly and Thumboormuzhy perching on twigs overhanging streams.

### **2. *Zygonyx iris* (Selys, 1869)**

Description: Male: Eyes are reddish brown above and pale grey below. Metallic greenish black thorax with yellow spots. Abdomen is metallic black with yellow rings. 7<sup>th</sup> segment has a broad dorsal yellow spot. Black legs and transparent wings.

Female: Similar to male. Thorax have more prominent yellow stripes.

Ecological notes: It was encountered as hovering over fast flowing streams in Athirappilly and Thumboormuzhy. Breeds in forested streams.

### **3. *Aciagrion occidentale* (Laidlaw, 1919)**

Description: Male: Eyes are sky blue below and black above. A blue line is present behind the head by connecting both eyes. Dorsal side of thorax is black with two bluish green stripes. Ventral side is sky blue. Legs are pale blue with black outer side. Transparent wings. Abdomen is black with blue rings. Ventral side and last three segments of abdomen are sky blue. 8<sup>th</sup> and 10<sup>th</sup> segments have a black spot on dorsal side.

Female: Resembling male in size and shape. But the colour is greenish blue instead of sky blue. Stripes of thorax are yellow coloured.

Ecological notes: It is not very common. Found in marshes, ponds and streams. During the survey it was located at Mannamangalam, Marottichal and Kanimangalam darting among grasses and shrubs.

### **4. *Agriocnemis splendidissima* (Laidlaw, 1919)**

Description: Male: Eyes are black above and apple green below. Thorax is black with two pale blue dorsal stripes. Ventral side of thorax is also pale blue. Bluish black legs. Transparent wings. Abdomen pale blue with extensive black markings. Hook shaped anal appendages.

Female: Resembling male but reddish brown thorax instead of black.

Ecological notes: It is not a common damselfly. Seen in marshes and weedy ponds of forested landscapes. Perches on vegetation close to water. It was found during the survey, darting among emergent vegetation in marshes of Poomala dam reservoir.

### 5. *Paracercioncalamorum* (Ris, 1916)

Description: Male: Eyes are olivaceous green with brownish black dorsal side. Head and thorax are pruinosed, they are bluish grey in colour. Thorax with fine hairs. Femora of leg is also pruinosed. Transparent wings. Abdomen is black but last segments are sky blue. Base of abdomen is also pruinosed.

Female: Similar to male but abdomen is brownish orange in colour with dorsal black marking.

Ecological notes: It is rarely reported in Kerala. During the study it was located in the marshes near Poomala dam reservoir, perching on lotus leaves. Eggs are inserted well in lotus leaves.

### 6. *Protostictagravelyi* (Laidlaw, 1915)

Description: Male: Blackish brown eyes. Thorax is metallic black with creamy white stripes. Pale white legs. Transparent wings. Black abdomen with creamy white rings at the end of segments.

Female: Abdomen is shorter and stouter than that of male.

Ecological notes: It is a rarely found damselfly. Males were found in shaded streams of Marottichal waterfalls and females on tree bark near water bodies.

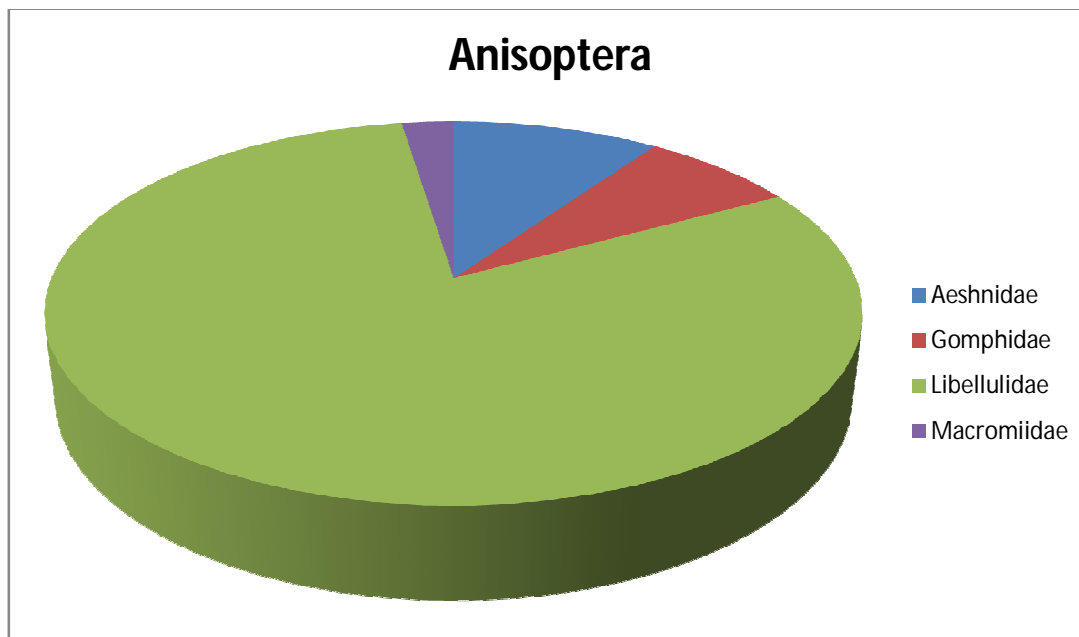


Figure 1: Family wise contribution of Dragonflies in Thrissur district.

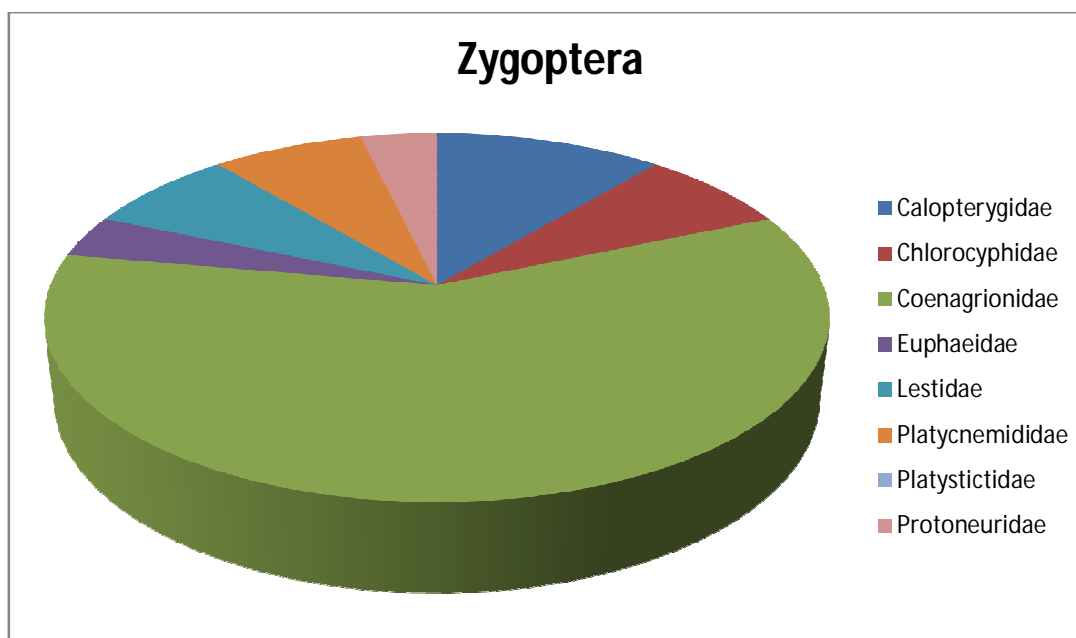


Figure 2: Family wise contribution of Damselflies in Thrissur district

Table 1: List of odonates observed during the survey

Sl No.	Scientific Name	Common Name	Locations	Status
<b>Suborder :Anisoptera</b>				
<b>Family: Aeshnidae</b>				
1.	<i>Anaxguttatus (Burmeister, 1839)*</i>	Blue Tailed Green Darner	Mannamangalam	C
2.	<i>Anaximmaculifrons (Rambur, 1842)</i>	Blue darner		C
3.	<i>Gynacanthabayadera (Selys, 1891)</i>	Parakeet darner		U
4.	<i>GynacanthadravidaLiefinck, 1960</i>	Brown darner	Common	
<b>Family: Gomphidae</b>				
5.	<i>Heliogomphuspromelas (Selys, 1873)</i>	Spotted Lyretail		U
6.	<i>Ictinogomphusrapax (Rambur, 1842)</i>	Common Clubtail	Common	C
7.	<i>Paragomphuslineatus (Selys, 1850)</i>	Common Hooktail		U
<b>Family: Libellulidae</b>				
8.	<i>Acisomapanorpoides (Rambur, 1842)</i>	Trumpet Tail	Common in plains and paddy fields	C
9.	<i>Aethriamantabrevipennis (Rambur, 1842)</i>	Scarlet Marsh Hawk	Common in all habitats	C
10.	<i>Brachydiplaxchalybea (Brauer, 1868)</i>	Rufous Backed Marsh Hawk	Common in plains	C
11.	<i>Brachydiplaxsobrina (Rambur, 1842)</i>	Little Blue Marsh Hawk	Mala	U
12.	<i>Brachythemiscontaminata (Fabricius, 1793)</i>	Ditch Jewel	Common in plains	C
13.	<i>Bradinopygageminata (Rambur, 1842)</i>	Granite Ghost	Common in all habitats	C
14.	<i>Crocothemis servilia (Drury, 1770)</i>	Ruddy Marsh Skimmer	Common in plains	C
15.	<i>Diplacodesnebulosa (Fabricius, 1793)</i>	Black Tipped Ground Skimmer	Nellayi, Poomala	U
16.	<i>Diplacodestrivialis (Rambur, 1842)</i>	Ground Skimmer	Common in all habitats	C
17.	<i>Hydrobasileus croceus (Brauer, 1867)</i>	Amber Winged Marsh Glider	Kanimangalam, Poomala	U
18.	<i>Indothemis carnatica (Fabricius, 1798)</i>	Black Scrub glider		R
19.	<i>Lathrecista asiatica (Fabricius, 1798)</i>	Asiatic Blood Tail	Common in all habitats	C

20.	<i>Neurothemisfulvia</i> (Drury, 1773)	Fulvous Forest Skimmer	Marottichal	C
21.	<i>Neurothemistullia</i> (Drury, 1773)	Pied Paddy Skimmer	Common in all habitats	C
22.	<i>Onychothemistestacea</i> (Laidlaw, 1902)*	Stellate River Hawk	Athirappilly	U
23.	<i>Orthetrumchrysis</i> (Selys, 1891)	Brown Backed Red Marsh Hawk	Common in all habitats	C
24.	<i>Orthetrumglaucum</i> (Brauer, 1865)	Blue Marsh Hawk	Marottichal	C
25.	<i>Orthetrumluzonicum</i> (Brauer, 1868)	Tricoloured Marsh Hawk	Mannamangalam	C
26.	<i>Orthetrumpruinsum</i> (Burmeister, 1839)	Crimson- Tailed Marsh Hawk	Athirappily	C
27.	<i>Orthetrum Sabina</i> (Drury, 1770)	Green Marsh Hawk	Common in all habitats	C
28.	<i>Pantalaflavescens</i> (Fabricius, 1798)	Wandering Glider	Common in all habitats	C
29.	<i>Potamarcha congener</i> (Rambur, 1842)	Yellow Tailed Ashy Skimmer	Kodungallur, Mannamangalam, Nellore	C
30.	<i>Rhodothemisrufa</i> (Rambur, 1842)	Rufous Marsh Glider	Nellore	C
31.	<i>RhyothemisVariegata</i> (Linnaeus, 1763)	Common Picturewing	Common in all habitats	C
32.	<i>Tetrathemisplatyptera</i>	Pigmy Skimmer	Mannamangalam, Kanimangalam	C
33.	<i>Tholymistillarga</i>	Coral Tailed Cloud Wing	Kanimangalam, Mala, Nellore, Kodungallur	C
34.	<i>Tramealimbata</i> (Desjardins, 1832)	Black Marsh Trotter	Mannamangalam, Kunnankulam	C
35.	<i>Trithemis aurora</i> (Burmeister, 1839)	Crimson Marsh Glider	Common in forests and plains	C
36.	<i>Trithemisfestiva</i> (Rambur, 1842)*	Black Stream Glider	Common in forested landscapes	C
37.	<i>Trithemispallidinervis</i> (Kirby, 1889)	Long Legged Marsh Glider	Poomala, Kole fields	C
38.	<i>Urothemissignata</i> (Rambur, 1842)	Greater Crimson Glider	Common in all habitats	C
39.	<i>Zygonyx iris</i> (Selys, 1869)*	Iridescent Stream Glider	Athirappilly	C
40.	<i>Zygomapetiolatum</i> (Rambur, 1842)	Brown Dusk Hawk	Common in all habitats	C
	<b>Family: Macromiidae</b>			
41.	<i>Epophthalmiavittata</i> (Burmeister, 1839)	Common Torrent Hawk		
	<b>Suborder: Zygoptera</b>			
	<b>Family: Calopterygidae</b>			
42.	<i>Neurobasischinensis</i> (Linnaeus, 1758)*	Stream Glory	Athirappilly	C
43.	<i>Vestalisapicalis</i> (Selys, 1873)	Black Tipped Forest Glory	Mannamangalam, Marottichal, Athirappilly	C
44.	<i>Vestalisgracilis</i> (Rambur, 1842)	Clear Winged Forest Glory	Athirappilly, Mannamangalam, Marottichal	C
	<b>Family: Chlorocyphidae</b>			
45.	<i>Libellagolineata</i> (Burmeister, 1839)	River Heliodor	Athirappilly, Marottichal	C
46.	<i>Rhinocyphabisignata</i> (Hagen in Selys, 1853)*	Stream Ruby	Athirappilly, Marottichal	C
	<b>Family: Coenagrionidae</b>			
47.	<i>Aciagrionoccidentale</i> (Laidlaw, 1919)*	Green Striped Slender	Kanimangalam, Mannamangalam	U
48.	<i>Agriocnemiskeralensis</i> (Peters, 1981)*	Kerala Dartlet	Common in plains	C
49.	<i>Agriocnemispieris</i> (Laidlaw, 1919)	White Dartlet	Common in all habitats	C
50.	<i>Agriocnemispygmaea</i> (Rambur, 1842)	Pygmy Dartlet	Common in all	C

			habitats	
51.	<i>Agriocnemissplendidissima</i> (Laidlaw, 1919)*	Splendid Dartlet	Poomala	U
52.	<i>Ceriagrioncerinorubellum</i>	Orange Tailed Marsh Dart	Common in all habitats	C
53.	<i>Ceriagrioncoromandelianum</i>	Coromandel Marsh Dart	Common in plains	C
54.	<i>Ceriagrionrubiae</i> (Laidlaw, 1916)	Orange Marsh Dart		
55.	<i>Ischnura aurora</i> (Brauer, 1865)	Golden Dartlet	Common in all habitats	C
56.	<i>Ischnurasenegalensis</i> (Rambur, 1842)*	Senegal Golden Dartlet	Kodungallur, Nellayi	C
57.	<i>Paracercioncalamorum</i> (Ris, 1916)*	Dusky Lily Squatter	Poomala	R
58.	<i>Pseudagrion decorum</i> (Rambur, 1842)*	Green Striped Grass Dart	Poomala	R
59.	<i>Pseudagrionindicum</i> (Fraser, 1924)*	Yellow Striped Grass Dart	Athirappilly	U
60.	<i>Pseudagrionmalabaricum</i> (Fraser, 1924)*	Jungle Grass Dart	Poomala	R
61.	<i>Pseudagrionmicrocephalum</i> (Rambur, 1842)	Blue Grass Dart	Common in plains	C
62.	<i>Pseudagrionrubriceps</i> (Selys, 1876)	Saffron Faced Grass Dart	Peechi, Athirappilly	C
	<b>Family: Euphaeidae</b>			
63.	<i>Dysphaeaethela</i> (Fraser, 1924)	Black Torrent Dart	Athirappilly	U
	<b>Family: Lestidae</b>			
64.	<i>Lesteselatus</i> (Hagen in Selys, 1862)	Emerald Spreadwing		C
65.	<i>Lestespraemorsus</i> (Hagen in Selys, 1862)	Sapphire Eyed Spreadwing		U
	<b>Family: Platycnemididae</b>			
66.	<i>Coperamarginipes</i> (Rambur, 1842)	Yellow Bush Dart	Common in all habitats	C
67.	<i>Coperavittata</i> (Selys, 1863)*	Blue Bush Dart	Common in forested landscapes	C
	<b>Family: Platystictidae</b>			
68.	<i>Platystictadeccanensis</i> (Laidlaw, 1915)	Saffron Reedtail		
69.	<i>Protostictagravelyi</i> (Laidlaw, 1915)*	Pied Reedtail	Marottichal	C
	<b>Family: Protoneuridae</b>			
70.	<i>Prodasinneuraverticalis</i> (Selys, 1860)	Black Bambootail	Athirappilly, Marottichal	C

## RESULTS & DISCUSSION

Up to 60 species of odonates could be recorded from different habitats of Thrissur district as a result of this survey. Out of these, 35 species belong to 26 genera and 3 families and come under suborder Anisoptera. The remaining 25 species belong to 15 genera and 6 families and come under suborder Zygoptera.

Nine species i.e. *Lesteselatus*, *Lestespraemorsus*, *Ceriagrionrubiae*, *Anaximmaculifrons*, *Gynacanthabayadera*, *Heliogomphuspromelas*, *Paragomphuslineatus*, *Epophthalmiavittata* and *Indothemiscarnaticareported* earlier by Adarsh et. Al (2014) , were not encountered during the survey. *Platystictadeccanensis* reported by Subramanian et. al. (2011) was also not seen during the present survey. Addition of these species with the present data results in a total of 70 species from Thrissur district.

Family Libellulidae with 33 species is found as the dominant family of dragonflies, followed by families Aeshnidae (4 species), Gomphidae (3 species) and lastly family Macromiidae (1 species).



In the case of damselflies, Family Coenagrionidae with 16 species is the dominant one followed by families Calopterygidae (3 species), Chlorocyphidae (2 species), Lestidae (2 species), Platynemididae (2species), Platystictidae (2species), Euphaeidae (1 species) and Protoneuridae (1 species) respectively.

*Brachydiplaxsobrina*, *Diplacodesnebulosa*, *Hydrobasileuscroceus*, *Onychothemistestacea* are the rarely encountered dragonflies during the study. The rarely found damselflies are *Aciagrionoccidentale*, *Agriocnemissplendidissima*, *Paracercioncalamorum*, *Pseudagrion decorum*, *Pseudagrionmalabaricum*, *Protostictagravelyi* etc.

Although the IUCN status of *Paracercioncalamorum* is Least concern, it is rarely found in Kerala. During the present study it is encountered near the water reservoir of Poomala dam, perching on lotus leaves.

More number of species could be observed in forested landscapes like Athirapally, Marottichal, Mannamangalam and Poomala. Majority of rare species are also found there. Although increased number of odonates could be found in kole wet lands of Kanimangalam, Nedupuzha, Manakkodi, Pullu etc. number of species found was moderate.

*Neurothemistullia*, *Rhyothemisvariegata*, *Orthetrum Sabina*, *Brachythemiscontaminata* etc. are the common dragonflies in all seasons. Large swarms of *Pantalaflavescens* was seen mainly in Post monsoon season. Commonly found damselflies are *Ceriagrioncoromandelianum*, *Ceriagrioncerenorubellum* and *Agriocnemispygmaea*. Along with common form, a pruinosed form of *Agriocnemispygmaea* was encountered in Athirappilly.

45% of total odonates of Kerala can be reported by this study. Further studies in this topic is significant as a lot of odonate species have to be revealed to explore the biodiversity of Thrissur district.

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