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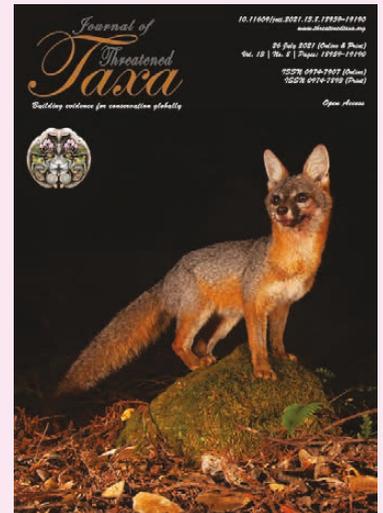
SHORT COMMUNICATION

A PRELIMINARY CHECKLIST OF DRAGONFLIES AND DAMSELFLIES (INSECTA: ODONATA) OF VAKKOM GRAMA PANCHAYATH, THIRUVANTHAPURAM DISTRICT, KERALA, INDIA

J. Arunima & P.O. Nameer

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A preliminary checklist of dragonflies and damselflies (Insecta: Odonata) of Vakkom Grama Panchayath, Thiruvananthapuram District, Kerala, India

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Abstract: A one-year study was conducted at Vakkom Grama Panchayath, Thiruvananthapuram district, Kerala, to assess the diversity of odonates. We report 49 species, which include 31 species of Anisoptera (dragonflies) and 18 species of Zygoptera (damselflies). Among dragonflies, the family Libellulidae dominated with 26 species, while Coenagrionidae with 10 species was the dominant family among the damselflies. The odonate diversity of Vakkom Grama Panchayath accounted for 28% of the odonates in Kerala and 25% of the odonates of the Western Ghats. Vakkom Grama Panchayath also recorded the presence of *Mortonagrion varralli* which is an uncommon species in Kerala. This study provides some important baseline information on the odonates of one of the grama panchayaths in Kerala, India. An updated checklist of 57 species of odonates of Thiruvananthapuram district, Kerala is also provided.

Keywords: Biodiversity register, Biological Diversity Act, odonates.

Dragonflies and damselflies constitute an order of carnivorous insects. They are treated as an important component of aquatic ecosystems as well as biological indicators of environmental conditions (Clark & Samways 1996; Samways et al. 2010). There are 497 species of odonates in 154 genera and 18 families recorded from India (Joshi & Sawant 2020; Kalkman et al. 2020; Payra et al. 2020; Subramaniyan & Babu 2017, 2020); 196 species in 14 families and 83 genera have been documented from the Western Ghats (Subramanian et al. 2018); and

175 species from Kerala to date (Society for Odonate Studies 2021).

The studies on the odonates from human-dominated landscapes from Kerala part include Peter (1981) who reported 26 species of odonates from the Thiruvananthapuram district of Kerala, which was later updated by Emiliyamma & Radhakrishnan (2002) to 43 species. Emiliyamma (2005) recorded 31 species of odonates from Kottayam district, Kerala. Adarsh et al. (2014) reported 52 species of odonates from Kerala Agricultural University campus, Thrissur, Kerala and Chandran et al. (2021) reported 44 species of odonates from the Kole Wetlands in Thrissur and Malappuram districts, Kerala.

Documentation of regional biodiversity is important for the long-term conservation and management of different taxa. Thus, a study was conducted at Vakkom Grama Panchayat in Thiruvananthapuram district, Kerala, southern India from November 2018 to December 2019, and the results of the same are presented here.

STUDY AREA

The Vakkom Grama Panchayath (VGP) is located 35 km north of Thiruvananthapuram city, in Chirayinkeezhu

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Competing interests: The authors declare no competing interests.

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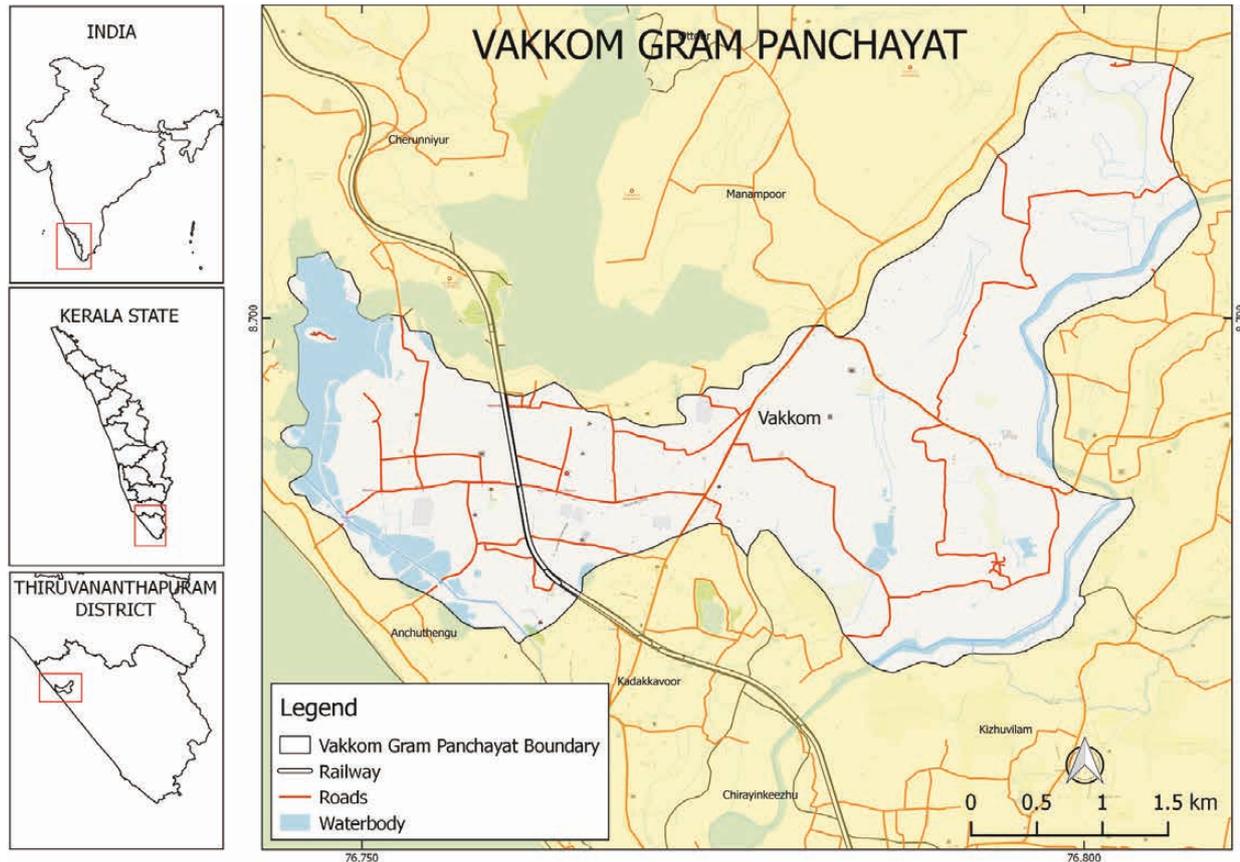


Figure 1. Location of Vakkom Grama Panchayath, Kerala.

Taluk (Figure 1). It is located between 8.69°N & 76.77°E and has a total area of 5.36 km². VGP is surrounded by backwaters and is an islet laced by Parvathiputhanar (ar= river) and Anchuthengu Kayal (kayal= backwater). The study area is enriched with various aquatic habitats like lakes, ponds, marshes, and backwaters.

METHODS

The odonates of VGP were studied between November 2018 and December 2019. The visual encounter survey method was followed and most of the taxa were photo-documented. The major aquatic habitats of the VGP are ponds, backwaters, canals, and paddy fields. The study sites were visited at least once a month and the survey was undertaken for two hours in the morning and one hour in the evening. The odonates were identified using the field guides such as Subramanian (2009) and Kiran & Raju (2013). Taxonomy and nomenclature have been updated after Kalkman et al. (2020). Based on the frequency of sighting the odonates it was categorized as Very Common (VC) when they were sighted during 75–100% of the field outings, Common (CO) when the sighting was between 50–75%,

Occasional (OC) when the sighting was only 25–50%, and Rare (RA) when the sighting was below 25%. The study period was categorised into three different seasons such as summer (February–May), monsoon (June–September), and post monsoon (October–January).

RESULTS

A total of 49 species of odonates (18 species of damselflies and 31 species of dragonflies) belonging to eight families were recorded from VGP (Table 1). Family Libellulidae (26 spp.) dominated among the Anisoptera followed by Aeshnidae (3) and Gomphidae (2). Among Zygoptera, the dominant family was Coenagrionidae (10 spp.) followed by Lestidae (3), Calopterygidae (2), Platycnemididae (2), and Chlorocyphidae (1). The family-wise distribution of species is shown in Figures 2 & 3. Libellulidae (26) and Coenagrionidae (11) are two dominant families of Odonates at VGP.

The occurrence data during the study period shows that out of 49 species, six were found to be Very Common, 19 species were Common, 16 species found to be Occasional, while eight species were Rare. Among Zygoptera, *Agriocnemis pygmaea* (Rambur,



Table 1. The checklist of odonates of Vakkam Grama Panchayath, Thiruvananthapuram, Kerala and an updated checklist of odonates of Thiruvananthapuram District, Kerala.

	Common name	Family/Scientific name	Relative frequency class	IUCN Red List status	Image no.	Remarks
	ORDER ZYGOPTERA (DAMSELFLIES)					
	Spread Wing	Family Lestidae				
1	Emerald Spreadwing	<i>Lestes elatus</i> Hagen in Selys, 1862	OC	LC		***
2	Sapphire-eyed Spreadwing	<i>Lestes praemorsus</i> Hagen in Selys, 1862	OC	LC	1	**
3	Brown Spreadwing	<i>Lestes concinnus</i> Hagen in Selys, 1862	R	DD	2	**
	Glories	Family Calopterygidae				
4	Black-tipped Forest Glory	<i>Vestalis apicalis</i> Selys, 1873	OC	LC	3	***
5	Clear-winged Forest Glory	<i>Vestalis gracilis</i> (Rambur, 1842)	OC	LC	4	***
	Stream jewels	Family Chlorocyphidae				
6	Stream Ruby	<i>Heliocypha bisignata</i> (Hagen in Selys, 1853)		LC		*
7	Southern Heliodor	<i>Libellago indica</i> (Fraser, 1928)	R	NE	5	**
	Bush darts	Family Platycnemididae				
8	Wayand Bambootail	<i>Caconeura risi</i> (Fraser, 1931)		DD		*
9	Yellow Bush Dart	<i>Copera marginipes</i> (Rambur, 1842)	CO	LC		***
10	Blue Bush Dart	<i>Copera vittata</i> (Selys, 1863)	CO	LC		***
11	Black Bambootail	<i>Prodasineura verticalis</i> (Selys, 1860)				*
	Marsh Darts	Family Coenagrionidae				
12	Green-Striped Slender Dartlet	<i>Aciagrion occidentale</i> Laidlaw 1919	OC	LC	6	***
13	White Dartlet	<i>Agriocnemis pieris</i> Laidlaw, 1919	OC	LC	7	**
14	Pigmy Dartlet	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	VC	LC	8	***
15	Kerala Dartlet	<i>Agriocnemis keralensis</i> Peters, 1981		LC		*
16	Splendid Dartlet	<i>Agriocnemis splendidissima</i> Laidlaw, 1919		LC		*
17	Orange-tailed Marsh Dart	<i>Ceriagrion cerinorubellum</i> (Brauer, 1865)	CO	LC	9	***
18	Coromandel Marsh Dart	<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)	CO	LC	10	***
19	Orange Marsh Dart	<i>Ceriagrion rubiae</i> Laidlaw, 1916	OC	LC		**
20	Golden Dartlet	<i>Ischnura rubilio</i> Selys, 1876	OC	LC	11	***
21	Senegal Golden Dartlet	<i>Ischnura senegalensis</i> (Rambur, 1842)	CO	LC	12	***
22	Brown Dartlet	<i>Mortonagrion varralli</i> Fraser, 1920	OC	DD	13	***
23	Jungle Grass Dart	<i>Pseudagrion malabaricum</i> Fraser, 1924		LC		*
24	Blue Grass Dart	<i>Pseudagrion microcephalum</i> (Rambur, 1842)	VC	LC	14	**
25	Saffron-faced Grass Dart	<i>Pseudagrion rubriceps</i> Selys, 1876				*
	ORDER ANISOPTERA (DRAGONFLIES)					
	Darners	Family Aeshnidae				
26	Pale-spotted Emperor	<i>Anax guttatus</i> (Burmeister, 1839)	OC	LC	15	**
27	Blue Darner	<i>Anax immaculifrons</i> Rambur, 1842	R	LC		**
28	Brown Darner	<i>Gynacantha dravida</i> Lieftinck, 1960	CO	DD		**
	Clubtails	Family Gomphidae				
29	Common Clubtail	<i>Ictinogomphus rapax</i> (Rambur, 1842)	CO	LC	16	**
30	Common Hooktail	<i>Paragomphus lineatus</i> (Selys, 1850)	R	LC		**
	Skimmers	Family Libellulidae				
31	Trumpet Tail	<i>Acisoma panorpoides</i> Rambur, 1842	CO	LC	17	***
32	Scarlet Marsh Hawk	<i>Aethriamanta brevipennis</i> (Rambur, 1842)	R	LC	18	***

	Common name	Family/Scientific name	Relative frequency class	IUCN Red List status	Image no.	Remarks
33	Rufous-backed Marsh Hawk	<i>Brachydiplax chalybea</i> Brauer, 1868	CO	LC	19	***
34	Little Blue Marsh Hawk	<i>Brachydiplax sobrina</i> (Rambur, 1842)	OC	LC		**
35	Ditch jewel	<i>Brachythemis contaminata</i> (Fabricius, 1793)	CO	LC	20	***
36	Granite Ghost	<i>Bradinopyga geminata</i> (Rambur, 1842)	VC	LC	21	***
37	Ruddy Marsh Skimmer	<i>Crocotthemis servilia</i> (Drury, 1773)	CO	LC	22	***
38	Ground Skimmer	<i>Diplacodes trivialis</i> (Rambur, 1842)	VC	LC	23	***
39	Amber-winged Marsh Glider	<i>Hydrobasileus croceus</i> (Brauer, 1867)	R	LC	24	**
40	Asiatic Blood-tail	<i>Lathrecista asiatica</i> (Fabricius, 1798)	R	LC	25	***
41	Fulvous Forest Skimmer	<i>Neurothemis fulvia</i> (Drury, 1773)	R	LC	26	**
42	Pied Paddy Skimmer	<i>Neurothemis tullia</i> (Drury, 1773)	VC	LC	27	***
43	Brown-backed Red Marsh Hawk	<i>Orthetrum chrysis</i> (Selys, 1891)	VC	LC	28,29	***
44	Tri-coloured Marsh Hawk	<i>Orthetrum luzonicum</i> (Brauer, 1868)	OC	LC	30	***
45	Crimson-tailed Marsh Hawk	<i>Orthetrum pruinosum</i> (Burmeister, 1839)	CO	LC	31	***
46	Green Marsh Hawk	<i>Orthetrum sabina</i> (Drury, 1770)	CO	LC	32	***
47	Wandering Glider	<i>Pantala flavescens</i> (Fabricius, 1798)	CO	LC	33	***
48	Yellow-tailed Ashy Skimmer	<i>Potamarcha congener</i> (Rambur, 1842)	OC	LC	34	***
49	Rufous Marsh Glider	<i>Rhodotthemis rufa</i> (Rambur, 1842)	OC	LC	35	***
50	Common Picture Wing	<i>Rhyothemis variegata</i> (Linnaeus, 1763)	CO	LC	36	***
51	Coral-tailed Cloud Wing	<i>Tholymis tillarga</i> (Fabricius, 1798)	CO	LC	37	***
52	Black Marsh Glider	<i>Tramea limbata</i> (Desjardins, 1832)	OC	LC		***
53	Crimson Marsh Glider	<i>Trithemis aurora</i> (Burmeister, 1839)	CO	LC	38	***
54	Black Stream Glider	<i>Trithemis festiva</i> (Rambur, 1842)	OC	LC	39	***
55	Long-legged Marsh Glider	<i>Trithemis pallidinervis</i> (Kirby, 1889)		LC		*
56	Greater Crimson Glider	<i>Urothemis signata</i> (Rambur, 1842)	CO	LC	40	**
57	Brown Dusk Hawk	<i>Zyxomma petiolatum</i> (Rambur, 1842)	CO	LC		***

LC—Least concern | NE—Not Evaluated | DD—Data Deficient | VC—Very common | CO—Common | OC—Occasional | R—Rare | *—Species listed in Emiliyamma & Radhakrishnan (2002) but not sighted from Vakkom GP | **—Addition to the odonates of Thiruvananthapuram district recorded during the present study | ***—Odonate species that are common in both checklists.

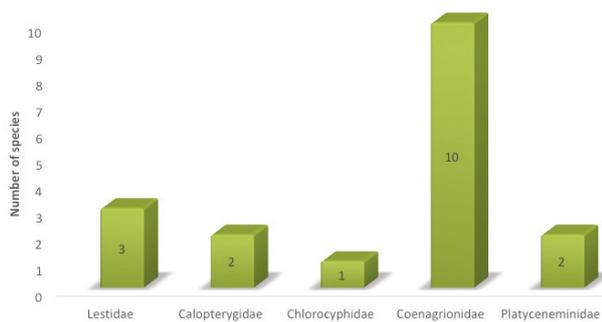


Figure 2. The number of species per different families of damselflies (Zygoptera) in Vakkam Grama Panchayath, Thiruvananthapuram, Kerala

1842) and *Pseudagrion microcephalum* (Rambur, 1842) were the most common species, whereas *Neurothemis tullia* (Drury, 1773) and *Bradinopyga geminata* (Rambur,

1842) were the most common species among Anisoptera. Monsoon season recorded the maximum number of species during the present study (Figure 4). Common species like *Neurothemis tullia* (Drury, 1773) and *Bradinopyga geminata* (Rambur, 1842) were found in almost all months during the study period. An updated checklist of 57 species of odonates of the Thiruvananthapuram district, Kerala is also presented in Table 1.

DISCUSSION

The current study on odonates of VGP revealed the presence of 49 species which constitute 28.65% of the total species of odonates of Kerala state. The VGP reports 15 additional species of odonates than the previously known from the Thiruvananthapuram district, Kerala (Emiliyamma & Radhakrishnan 2002), however eight

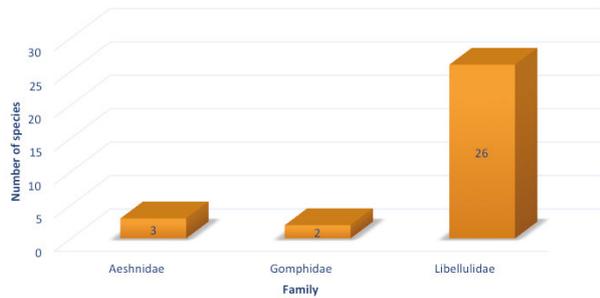


Figure 3. The number of species per different families of dragonflies (Anisoptera) in Vakkom Grama Panchayath, Thiruvananthapuram, Kerala.

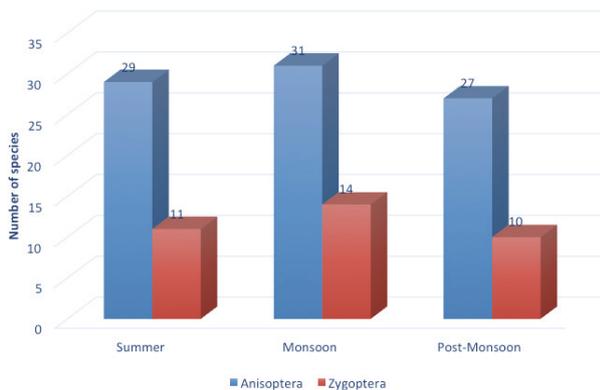


Figure 4. The seasonal variation in the species richness of odonates in Vakkom Grama Panchayath, Thiruvananthapuram, Kerala.

species previously reported from Thiruvananthapuram district could not be located from VGP. It is also interesting to note that a small grama panchayath (5.6 km²) supports a high diversity of odonates.

CONCLUSION

This documentation becomes important in the light of the national Biological Diversity Act (2002) of the Government of India, and one of the mandates of which is the preparation of the local biodiversity registers at the Panchayath level across the country.

The information gathered as part of this study could be useful in this backdrop and could even ensure the long-term conservation of these little-known taxa.

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Image 1. *Lestes praemorsus*



Image 2. *Lestes concinnus*



Image 3. *Vestalis apicalis*



Image 4. *Vestalis gracilis*



Image 5. *Libellago indica*



Image 6. *Acciagrion occidentale*



Image 7. *Agriocnemis pieris*



Image 8. *Agriocnemis pygmaea*



Image 9. *Ceriagrion coromandelianum*



Image 10. *Ceriagrion cerinorubellum*



Image 11. *Ischnura rubilio*



Image 12. *Ischnura senegalensis*



Image 13. *Mortonagrion varralli*



Image 14. *Pseudagrion microcephalum*



Image 15. *Anax guttatus*



Image 16. *Ictinogomphus rapax*



Image 17. *Acisoma panorpoides*



Image 18. *Aethriamanta brevipennis*



Image 19. *Brachydiplax chalybea*



Image 20. *Brachythemis contaminata*



Image 21. *Bradinopyga geminata*



Image 22. *Crocothemis servilia*



Image 23. *Diplacodes trivialis*



Image 24. *Hydrobasileus croceus*



Image 25. *Lathrecista asiatica*



Image 26. *Neurothemis fulvia*



Image 27. *Neurothemis tullia*



Image 28. *Orthetrum chrysis*



Image 29. *Orthetrum chrysis*



Image 30. *Orthetrum luzonicum*



Image 31. *Orthetrum pruinosum*



Image 32. *Orthetrum sabina*



Image 33. *Pantala flavescens*



Image 34. *Potamarcha congener*



Image 35. *Rhodthemis rufa*



Image 36. *Rhythemis variegata*



Image 37. *Trithemis tillarga*



Image 38. *Trithemis aurora*



Image 39. *Trithemis festiva*



Image 40. *Urothemis signata*



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