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continued on the back inside cover

Cover: *Euphaea pseudodispar* shot at Kalindi River, Thirunelly, Wayanad district, Kerala. © Muneer P.K.

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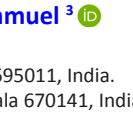

COMMUNICATION

The dragonflies and damselflies (Insecta: Odonata) of Shendurney Wildlife Sanctuary, southern Western Ghats, India

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Abstract: The odonate diversity of Shendurney Wildlife Sanctuary, southern Western Ghats (WG) of Kerala state, is discussed in this paper. A total of 181 species belonging to 87 genera and 14 families have been compiled for Kerala and this includes 68 Western Ghats endemics. A total of 116 species of odonates including 33 endemics were recorded for the region. A total of 41 damselflies (Zygoptera) and 75 dragonflies (Anisoptera) were recorded for the sanctuary. Shendurney thus harbours 56.04 % of WG and 64.08 % of the odonate diversity of Kerala. In addition, this includes 48.52% of Kerala and 41.25 % of endemic odonates of Western Ghats. About 29% of all the species recorded for the Shendurney are endemic to WG. With respect to IUCN Red List of Threatened Species, one species is 'Endangered', three 'Vulnerable', two 'Near Threatened', 84 'Least Concern', 20 'Data Deficient', and six species whose IUCN Red List status was not assessed. Family Libellulidae (41 species) dominated the odonate diversity, followed by Coenagrionidae (15 species) and Gomphidae (13 species). Regarding the occurrence status, we found that 11 species were Very Common, 42 species were found to be Common, 34 species Not Rare, 10 species were Rare, and 19 species were Very Rare inside the sanctuary. None of the species listed is protected under the Indian Wildlife Protection Act 1972.

Keywords: Anisoptera, checklist, endemicity, IUCN Red List, Kerala, Zygoptera.

Abbreviations: IUCN—The International Union for Conservation of Nature | RF—Reserve Forest | TIES—Tropical Institute of Ecological Sciences | TNHS—Travancore Nature History Society | TORG—TNHS Odonate Research Group | TR—Tiger Reserve | WG—Western Ghats | WS—Wildlife Sanctuary.

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Author contributions: KS planned and executed the fieldwork and surveys, laid the concept and wrote the manuscript. VPN edited the drafts and did fieldwork. AS helped with the drafts and fieldwork.

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INTRODUCTION

The Shendurney Wildlife Sanctuary (8.80–8.95 N, 77.07–77.27 E), with an area of 171 km^2 is located in the northern aspect of the Agasthyamalai hills of the southern Western Ghats and lies in the catchment of the Parappar Dam (Thenmalai) constructed across the west-flowing Kallada River (Image 1). The Achankovil gap separates this region from the Pandalam hills, which is the southernmost extension of the Annamalai Hills Complex. The Kuttalam (Courtallam) reserve forest lies to the north-east of the sanctuary. The state boundary of Kerala with Tamil Nadu delineates its eastern border. On the southeastern side lies the Papanasam RF and Mundanthurai region of the Kalakkad-Mundanthurai TR in Tamil Nadu. The southern boundary lies along the border of the Thiruvananthapuram Forest Division where Kulathupuzha and Yerur RFs lie in contiguity with the sanctuary. A narrow stretch of reserved forest tract of the Paruthipally range separates it from Peppara WS in the south (Nair 1991). Much of the terrain of the region is undulating, with valleys and high hills. The altitude ranges from 100 m at the base of the hill to 1,550 m on top of Alwarkurichi, the highest peak. The weather is hot and humid with 2,500–5,000 mm of rainfall received during both the monsoons (Nair 1991). The temperature varies from 16 ˚C to 35 ˚C (Mathew et al. 2004). Most of the region is accessible from strategically located base camps for biodiversity assessments. The Shendurney WS has good floral diversity (Subramanian 1995). The vegetation types found here are the west-coast tropical evergreen, southern hilltop tropical evergreen, west-coast tropical semi-evergreen, and southern subtropical hill forests, southern moist mixed deciduous forests, *Ochlandra* reed brakes, myristica swamp forest, and grasslands (Chandrashekaran 1962). Shendurney was relatively unexplored as far as odonates were concerned. There are no published papers on the odonate fauna of the sanctuary and the only available literature are the survey reports submitted by the TNHS to Shendurney WS from 2011 to 2021.

MATERIALS AND METHODS

Eight basecamps at different elevations and habitats were used to assess the odonate diversity of the 171 km^2 sanctuary (Image 1). The entire sanctuary was systematically covered by using six base camps; located at Darbhakulam, Idimuzhangan, Kallar, Kattalapara, Pandimotta, Rockwood, Rosemala, and Umayar. Transects were laid considering the location of water bodies at the basecamps. A standard transect length of 3 km, 3 m wide was covered in 3 hours and odonates were documented by a three-member team. Each station was covered using 30 such transects that were analysed for presence or absence data. The paper is based majorly on the field data from monthly visits to Shendurney WS since the year 2000. In addition, the consolidated report of systematic surveys done twice a year (May and December) in the sanctuary from 2010 to 2022 by TNHS, Trivandrum submitted to Shendurney WS, Kerala Forest Department (Sadasivan et al. 2021), was also consulted.

The odonates were field-observed and photographed as far as possible with special consideration to the prothorax and anal appendages. With a valid research permit, few of the confusing species were caught, field-observed under loupe magnification (ZEISS EyeMag Pro 5x450 mm Carl Zeiss Meditec Inc.) and released. Photographs of interesting odonates and dead specimens in the field were taken with Canon EOS 70D DSLR fitted with a 180 mm macro lens and MPE 65 f 2.8 1–5x Lens (Canon Inc., Japan). Photographs of interesting odonates are included (Images 3–6).

The basic taxonomy of odonates follows Fraser (1933,

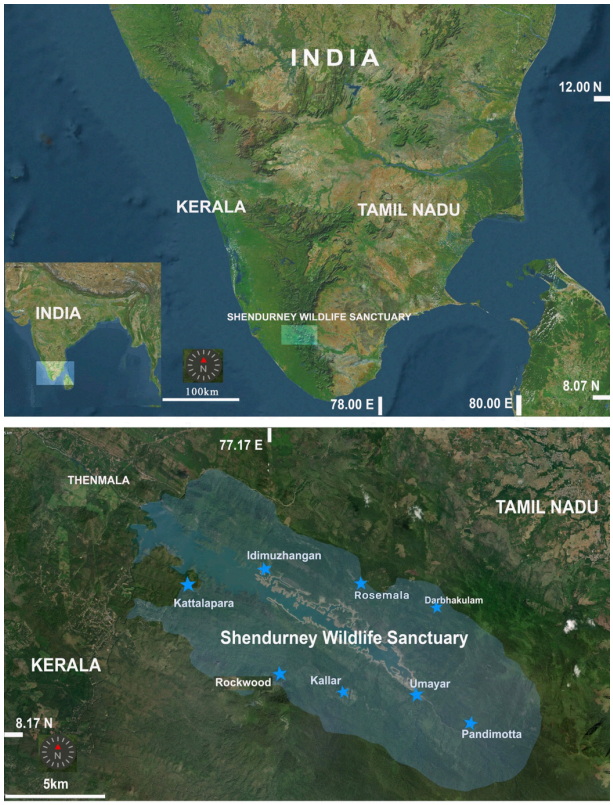

Image 1. Map of Shendurney WS with study locations. Based on Apple Maps, Copyright © 2012–2020 Apple Inc.

1934, 1936) and is updated as per Kalkman et al. (2020). The current Odonata checklist and distribution for Kerala follows Subramanian & Babu (2017), Subramanian et al. (2018), Paulson et al. (2021), and Nair et al. (2021). The occurrence status is based on transect data with status as Very Common (VC) if seen in >75% transects, Common (C) if seen in 50–75%, Not Rare (NR) is seen in 25–25% transects, Rare (R) in a case seen in 5–25%, and Very Rare (VR) is seen in <5% of the transects. The conservation status as per the IUCN Red List of Threatened Species is derived from the IUCN site http://www.iucnredlist.org (IUCN 2021). We define the occurrence status of a species as 'Locally Common' when it is commonly seen only in a particular location, habitat, station or elevation, but is rare when the transect or distribution data from the whole sanctuary is considered.

RESULTS AND DISCUSSION

A total of 116 species of odonates including 32 endemics were recorded for the Shendurney region, while the current checklist of odonates of WG is at 207 species with 80 endemics and that of Kerala state is 181 species (87 genera, 14 families) and 68 WG (Nair et al. 2021) (see Appendix 1). A total of 116 species of odonates including 32 endemics were recorded from Shendurney WS. Rao & Lahiri (1982) recorded 23 species from Silent Valley and New Amarambalam RF; Emiliyamma & Radhakrishnan (2000, 2014) reported 39 species from Parambikukam WS, Mathavan & Miller (1989) had reported 36 species from Periyar TR, Gnanakumar et al. (2012) had reported 55 species from Chimmony WS; Adarsh et al. (2015) gave a checklist of 48 species from Chinnar, and 82 species were observed from Thattaekkad bird sanctuary and its environs by Varghese et al. (2014). Palot & Kiran (2016) reported 93 species from Aaralam WS. Thus, it is to be noted that Shendurney WS has the highest species diversity of odonates amongst protected areas in Kerala state known as of present.

We observed 41 damselflies (Zygoptera) and 75 dragonflies (Anisoptera) from the sanctuary (Figure 1B). Family Libellulidae dominated the odonate diversity with 41 species, it was followed by Coenagrionidae (15 species) and Gomphidae (13 species) (Figure 1B).

The species diversity was highest at Kattalapara (88 species), followed by Darbhakulam (72) and then Umayar (69 species) (Figure 2A). The lowest numbers were at Pandimotta (35 species), but this station had some rare and endemic species (see Appendix I). The

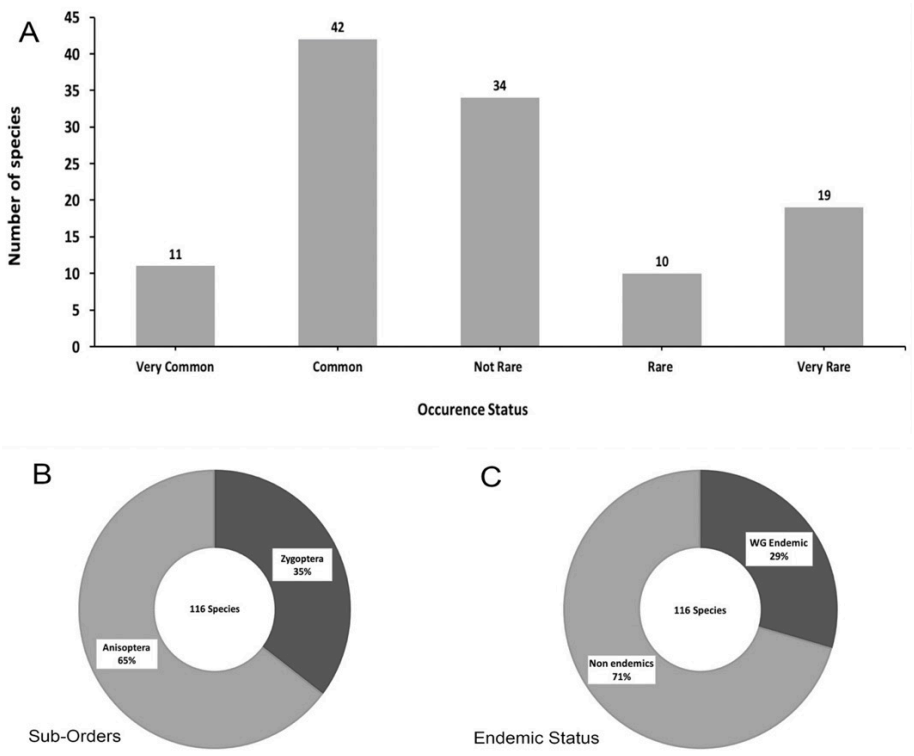

Figure 1. A—The Occurrence status of odonates of Shendurney WS | B—The percentage composition of Zygoptera (Damselflies) and Anisoptera (Dragonflies) at Shendurney WS | C—The percentage composition of endemics and non-endemic odonates at Shendurney WS.

Table 1. Details of base camps selected for the assessment in Shendurney Wildlife Sanctuary.

	Station	Elevation (m)	Major habitat/forest types
1	Darbhakulam	200–800	West-coast tropical evergreen, tropical semi-evergreen, Ochlandra reed patches, riparian forests, secondary forests, and cultivation
2	Idimuzhangan	100–250	West-coast tropical evergreen, southern moist mixed deciduous, Ochlandrareed patches, riparian vegetation, Myristica swamps, secondary forests, Ochlandrareed patches, and plantations
3	Kattalapara	100–500	West-coast tropical evergreen forest, west-coast semi-evergreen forest, moist mixed deciduous forest, Myristica swamp, Ochlandra patches
4	Kallar	500–1000	West-coast tropical evergreen forest, west-coast semi-evergreen forest, monoculture plantation, southern hilltop tropical evergreen forest, Ochlandra patches
5	Pandimotta	1000–1500	Southern hilltop tropical evergreen forest, southern sub-tropical hill forest, Ochlandra brakes
6	Rockwood	250–600	West-coast tropical evergreen, tropical semi-evergreen, and abandoned plantations
7	Rosemala	100–600	West-coast tropical evergreen, tropical semi-evergreen, Ochlandra reed patches, riparian forests, secondary forests, and cultivation
8	Umayar	100–500	West-coast tropical evergreen, tropical semi-evergreen, secondary forests, Ochlandra reed patches, and riparian patches

sanctuary has a good number of interesting records as stated below. *Elattoneura tetrica* (Laidlaw, 1917) was recorded from Kattalapara. *Vestalis submontana* Fraser, 1934, was locally common in the higher reaches of the mountains above 800 m (Image 3A). *Euphaea cardinalis* (Fraser, 1924) was usually seen confined to small streams of the hills (Image 3F), and *Euphaea fraseri* (Laidlaw, 1920) was generally restricted to low elevations (Image 3E); though they are occasionally found together after monsoons in low altitudes. *Chlorogomphus xanthoptera* (Fraser, 1919) is the sole member of Chlorogomphidae and was recorded only at high elevations at Pandimotta (Image 5B). The notable gomphids that were seen in the high elevations were *Asiagomphus nilgiricus* Laidlaw, 1922 (Image 5F), and *Heliogomphus promelas* (Selys, 1873), while *Acrogomphus fraseri* Laidlaw, 1925 (Image 5D), *Burmagomphus pyramidalis* Laidlaw, 1922, *Burmagomphus laidlawi* Fraser, 1924 (Image 5E), and

Table 2. Endemic odonates of the Western Ghats, reported from Shendurney Wildlife Sanctuary.

	Family	Scientific name
1	Chlorocyphidae	*Calocypha laidlawi* (Fraser, 1924)
2	Coenagrionidae	*Aciagrion approximans krishna* Fraser, 1921*
3	Coenagrionidae	*Agriocnemis keralensis* Peters, 1981
4	Coenagrionidae	*Pseudagrion indicum* Fraser, 1924
5	Euphaeidae	*Euphaea cardinalis* (Fraser, 1924)
6	Euphaeidae	*Euphaea fraseri* (Laidlaw, 1920)
7	Platycnemididae	*Caconeura risi* (Fraser, 1931)
8	Platycnemididae	*Elattoneura tetrica* (Laidlaw, 1917)
9	Platycnemididae	*Esme mudiensis* Fraser, 1931
10	Platystictidae	*Indosticta deccanensis* Laidlaw, 1915
11	Platystictidae	*Protosticta cyanofemora* Joshi, Subramanian, Babu & Kunte, 2020
12	Platystictidae	*Protosticta gravelyi* Laidlaw, 1915
13	Platystictidae	*Protosticta rufostigma* Kimmins, 1958
14	Platystictidae	*Protosticta sanguinostigma* Fraser, 1922
15	Chlorogomphidae	*Chlorogomphus xanthoptera* (Fraser, 1919)
16	Gomphidae	*Acrogomphus fraseri* Laidlaw, 1925
17	Gomphidae	*Asiagomphus nilgiricus* Laidlaw, 1922
18	Gomphidae	*Burmagomphus pyramidalis* Laidlaw, 1922
19	Gomphidae	*Cyclogomphus flavoannulatus* Rangnekar, Dharwadkar, Kalesh & Subramanian, 2019
20	Gomphidae	*Gomphidia kodaguensis* Fraser, 1923
21	Gomphidae	*Macrogomphus wynaadicus* Fraser, 1924
22	Gomphidae	*Merogomphus tamaracherriensis* Fraser, 1931
23	Gomphidae	*Melligomphus acinaces* (Laidlaw, 1922)
24	Libellulidae	*Epithemis mariae* (Laidlaw, 1915)
25	Macromiidae	*Macromia ellisoni* Fraser, 1924
26	Macromiidae	*Macromia irata* Fraser, 1924
27	Genera insertae sedis	*Idionyx corona* Fraser, 1921
28	Genera insertae sedis	*Idionyx galeata* Fraser, 1924
29	Genera insertae sedis	*Idionyx minima* Fraser, 1931
30	Genera insertae sedis	*Idionyx saffronata* Fraser, 1924
31	Genera insertae sedis	*Idionyx travancorensis* Fraser, 1931
32	Genera insertae sedis	*Idionyx gomantakensis* Subramanian, Rangnekar & Nayak, 2013
33	Genera insertae sedis	*Macromidia donaldi donaldi* (Fraser, 1924)

*subspecies is endemic to WG (Kalkman et al. 2020).

Melligomphus acinaces (Laidlaw, 1922) (Image 5C) were generally seen in mid-elevations (500–1,000 m). *Orthetrum triangulare triangulare* (Selys, 1878) is a locally Common species above 800 m. Three species, *Calocypha laidlawi* (Fraser, 1924) (Image 3B). *Epithemis mariae* (Laidlaw, 1915) (Image 6D), and *Lyriothemis*

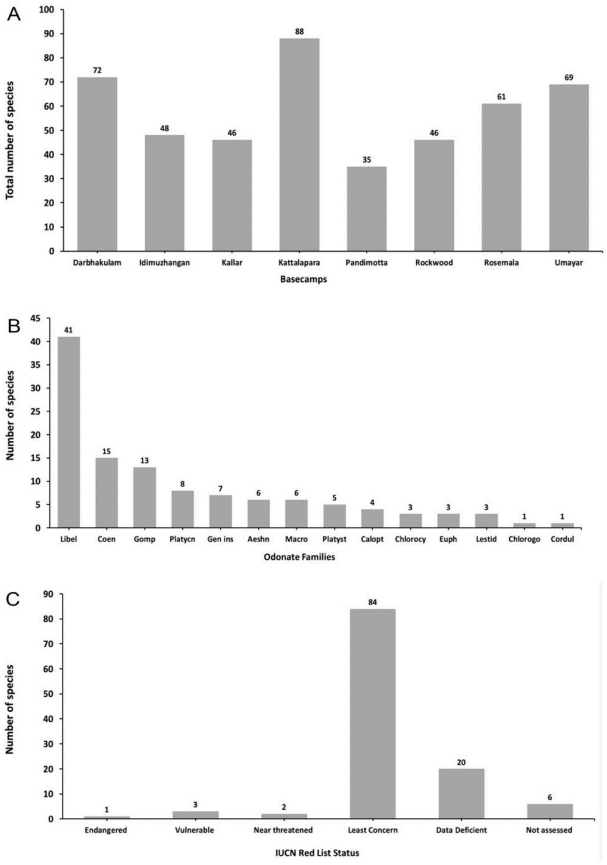

Figure 2. A—Odonate diversity across base camps at Shendurney WS | B—The diversity of different odonate families at Shendurney WS | C—IUCN Red List species composition of odonates at Shendurney WS. (Aeshn—Aeshnidae | Calopt—Calopterygidae | Chlorocy—Chlorocyphidae | Chlorogo—Chlorogomphidae | Coen—Coenagrionidae | Cordul—Corduliidae | Euph—Euphaeidae | Gen ins—Genera insertae sedis | Gomp—Gomphidae | Lestid—Lestidae | Libel—Libellulidae | Macro—Macromiidae | Platycn—Platycnemididae | Platyst—Platystictidae).

tricolor Ris, 1919 (Image 6B) were seen in lower elevations. *Epithemis mariae* and *Lyriothemis tricolor* were mostly seen around Myristica swamps while the latter was a tree-hole breeder. *Lyriothemis* males were seen guarding the water-filled tree holes at Kattalapara, Umayar, and Rosemala. *Cyclogomphus flavoannulatus* Rangnekar, Dharwadkar, Kalesh & Subramanian, 2019 (Image 5H), and *Cyclogomphus heterostylus* Selys, 1854 were generally seen in the foothills. *Pantala flavescens* (Fabricius, 1798) was the commonest migratory species, while *Anax ephippiger* (Burmeister, 1839) was not uncommon at Umayar during the first half of the year, before the south-west monsoon. We observed that the species in the genera *Macromia* and *Idionyx* found in Shendurney WS were forest insects. While the former preferred large streams, the latter and *Macromidia* were confined to smaller streams and rocky edges of large streams. *Macromia* was represented by *M. cingulata* Rambur, 1842, *M. ellisoni* Fraser, 1924 (Image 6F), *M. flavocolorata* Fraser, 1924 (Image 6E), and *M. irata* Fraser, 1924 (Image 6C). The distribution of *M. irata* was interesting in the fact that it was observed foraging on the edges of Myristica swamps, while others were riverine insects preferring open waters. Six species of *Idionyx* are seen in the sanctuary. Of them, *I. saffronata* Fraser, 1924 and *I. travancorensis* Fraser, 1931, are the commonest and seen in huge swarms in clearings on hills hawking insects at dusk. *I. galeata* Fraser, 1924, *I. corona* Fraser, 1921 (Image 6G), and *I. minima* Fraser, 1931 are much rarer compared to the others in our observation. *I. gomantakensis* Subramanian et al., 2013 (Image 6H), was seen in the vicinity of Myristica swamps at Kattalapara. *Macromidia donaldi donaldi* (Fraser, 1924) is a low to mid-elevation species seen at the edges of large streams. *Lestes concinnus* Hagen in Selys, 1862 is occasionally seen in the low elevations of Umayar and Kattalapara. *Protosticta cyanofemora* Joshi et al., 2020 (Image 4E), and *Protosticta rufostigma* Kimmins, 1958 (Image 4C) were recorded above 800 m from Pandimotta. *Indosticta deccanensis* Laidlaw, 1915 (Image 4B), was recorded from Darbhakulam and Rockwood.

Occurrence Status

Regarding the occurrence status, we found that according to our working definition, 11 species were Very Common, 42 species were found to be Common, 34 species Not Rare, 10 species were Rare and 19 species were Very Rare (Figure 2A). The most common species seen in the region with respect to numbers were *Pantala flavescens* (Fabricius, 1798), *Brachythemis contaminata* (Fabricius, 1793), *Ceriagrion coromandelianum* (Fabricius, 1798), and *Diplacodes trivialis* (Rambur, 1842). The rarest of the species were *Idionyx galeata*, *Protosticta cyanofemora, Cyclogomphus flavoannulatus, Epophthalmia frontalis binocellata* Fraser, 1936, and *Idionyx gomantakensis.*

Endemic Status

We found 33 species from the Shendurney region which were strictly endemic to Western Ghats (Table 2). Thus, about 29 percent of the odonates of the Shendurney are Western Ghats endemics (Figure 12C).

Status as per IUCN Red List of Threatened Species

With respect to the IUCN Red List of Threatened Species, there was one 'Endangered' species, three 'Vulnerable', two 'Near Threatened', 84 'Least Concern', 20 'Data Deficient', and six species whose IUCN status was not available (Figure 2C). *Idionyx galeata*, reported from

Image 2. Major habitats Shendurney WS: A—Southern Subtropical Hill Forests | B—West Coast Tropical Evergreen | C—Myristica Swamp Forests | D—West Coast Tropical Semievergreen | E—Southern Moist Mixed Deciduous Forests | F—Southern Hilltop Tropical Evergreen Forests. Photo © A & F—Raghuram | C—Ajithkumar | B, D & E—Kalesh Sadasivan.

Pandimotta is an Endangered and very rare dragonfly. *Heliogomphus promelas* is a Near Threatened and rare gomphid that was recorded in the montane swamps of subtropical jungles at 1,200 m from Pandimotta. *Indothemis carnatica* another Near Threatened species was seen at Kattalapara. Three species are under the Vulnerable category – *Indosticta deccanensis, Protosticta sanguinostigma* Fraser, 1922 (Image 4F), and *Chlorogomphus xanthoptera.* Six species whose status needs to be assessed are *Protosticta cyanofemora, Paplopleura sexmaculata* (Fabricius, 1787), *Idionyx gomantakensis*, *Vestalis submontana, Cyclogomphus flavoannulatus,* and *Merogomphus tamaracherriensis* Fraser, 1931 (Image 5G).

Image 3. A—*Vestalis submontana* Fraser, 1934 © Kalesh Sadasivan | B—*Calocypha laidlawi* (Fraser, 1924) © K. Baiju | C—*Agriocnemis keralensis* Peters, 1981 © Vinayan P. Nair | D—*Aciagrion approximans krishna* Fraser, 1921 © Kalesh Sadasivan | E—*Euphaea fraseri* (Laidlaw,1920) © Kalesh Sadasivan | F—*Euphaea cardinalis* (Fraser, 1924) © Kalesh Sadasivan | G—*Caconeura risi* (Fraser, 1931) © Kalesh Sadasivan | H—*Esme mudiensis* Fraser, 1931 © Kalesh Sadasivan.

Image 4. A—*Pseudagrion indicum* Fraser, 1924 © Vinayan P. Nair | B—*Indosticta deccanensis* Laidlaw, 1915 © Abraham Samuel | C—*Protosticta rufostigma* Kimmins 1958 © Kalesh Sadasivan | D—*Protosticta gravelyi* Laidlaw, 1915 © Kalesh Sadasivan | E—*Protosticta cyanofemora* Joshi et al., 2020 © Kalesh Sadasivan | F—*Protosticta sanguinostigma* Fraser, 1922 © Kalesh Sadasivan | G—*Onychargia atrocyana* (Selys, 1865) © Abraham Samuel | H—*Prodasineura verticalis annandalei* (Fraser, 1921) © Kalesh Sadasivan.

Image 5. A—*Macrogomphus wynaadicus* Fraser, 1924 © Kalesh Sadasivan | B—*Chlorogomphus xanthoptera* (Fraser, 1919) © Kalesh Sadasivan | C—*Melligomphus acinaces* (Laidlaw, 1922) © Kalesh Sadasivan | D—*Acrogomphus fraseri* Laidlaw, 1925 © Toms Augustine | E—*Burmagomphus laidlawi* Fraser, 1924 © Kalesh Sadasivan | F—*Asiagomphus nilgiricus* Laidlaw, 1922 © Kalesh Sadasivan | G—*Merogomphus tamaracherriensis* Fraser, 1931 © Vinayan P. Nair | H—*Cyclogomphus flavoannulatus* Rangnekar, Dharwadkar, Kalesh & Subramanian, 2019 © Kalesh Sadasivan.

Image 6. A—*Rhyothemis triangularis* Kirby, 1889) © Vinayan P. Nair | B—*Lyriothemis tricolor* Ris, 1919 © Kalesh Sadasivan | C—*Macromia irata* Fraser, 1924 © Kalesh Sadasivan | D—*Epithemis mariae* (Laidlaw, 1915) © Kalesh Sadasivan | E—*Macromia flavocolorata* Fraser, 1924 © Kalesh Sadasivan | F—*Macromia ellisoni* Fraser, 1924 © Kalesh Sadasivan | G—*Idionyx corona* Fraser, 1921 © Kalesh Sadasivan | H—*Idionyx gomantakensis* Subramanian, Rangnekar & Nayak, 2013 © Kalesh Sadasivan.

CONCLUSION

Shendurney WS has the highest number of species reported for any protected area in Kerala especially considering the small area of 171 km^2. The odonate fauna of Shendurney is rich and harbours 56.04% of WG and 64.08% of the odonate diversity of Kerala. In addition, this includes 48.52% of Kerala and 41.25% of endemic odonates of Western Ghats. About 29% of all the odonates recorded from Shendurney are endemic to WG. None of the species is protected under the Indian Wildlife Protection Act 1972. Myristica swamps of Kattalapara and Umayar and the subtropical hill forests of Pandimotta are unique habitats harbouring endemic and rare odonates. Seasonal changes in odonate diversity and population dynamics with respect to the monsoons need to be elucidated with further studies.

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Appendix I. List of Odonates of Shendurney Wildlife Sanctuary.

	Scientific name	ST	EN	RL	DR	ID	KL	KT	PM	RK	RM	UM
Sub-Order Zygoptera												
Family Calopterygidae												
1	*Neurobasis chinensis* (Linnaeus, 1758)	C	–	LC	√	√	√	√	–	√	√	√
2	*Vestalis apicalis* Selys, 1873	C	–	LC	√	√	√	√	–	√	√	√
3	*Vestalis gracilis* (Rambur, 1842)	C	–	LC	√	√	√	√	–	√	√	√
4	*Vestalis submontana* Fraser, 1934	NR	–	NA	–	–	–	–	√	–	–	–
Family Chlorocyphidae												
5	*Calocypha laidlawi* (Fraser, 1924)	NR	√	DD	–	–	–	√	–	√	–	–
6	*Heliocypha bisignata* (Hagen in Selys, 1853)	C	–	LC	√	√	√	√	–	√	√	√
7	*Libellago indica* (Fraser, 1928)	C	–	LC	√	√	√	√	–	√	√	√
Family Coenagrionidae												
8	*Aciagrion approximans krishna* Fraser, 1921*	NR	√	LC	–	–	–	–	√	–	–	–
9	*Aciagrion occidentale* Laidlaw, 1919	C	–	LC	√	√	√	√	–	√	√	√
10	*Agriocnemis keralensis* Peters, 1981	C	√	LC	–	–	–	√	–	–	–	–
11	*Agriocnemis pieris* Laidlaw, 1919	C	–	LC	√	√	–	√	–	–	–	√
12	*Agriocnemis pygmaea* (Rambur, 1842)	C	–	LC	√	√	–	√	–	–	√	√
13	*Agriocnemis splendidissima* Laidlaw, 1919	VR	–	LC	–	–	–	√	–	–	√	–
14	*Ceriagrion cerinorubellum* (Brauer, 1865)	C	–	LC	–	√	√	√	–	√	√	√
15	*Ceriagrion coromandelianum* (Fabricius, 1798)	VC	–	LC	√	√	√	√	–	√	√	√
16	*Ischnura rubilio* Selys, 1876	C	–	LC	√	√	√	√	√	√	√	√
17	*Ischnura senegalensis* (Rambur, 1842)	NR	–	LC	√	√	–	√	–	√	√	√
18	*Pseudagrion decorum* (Rambur, 1842)	R	–	LC	–	–	–	√	–	√	–	√
19	*Pseudagrion indicum* Fraser, 1924	NR	√	LC	√	–	–	√	–	–	–	–
20	*Pseudagrion malabaricum* Fraser, 1924	C	–	LC	–	–	–	√	–	–	–	–
21	*Pseudagrion microcephalum* (Rambur, 1872)	C	–	LC	√	–	–	√	–	√	–	–
22	*Pseudagrion rubriceps* (Selys, 1876)	C	–	LC	√	–	–	√	–	–	√	√
Family Euphaeidae												
23	*Dysphaea ethela* Fraser, 1924	R	–	DD	–	–	–	√	–	–	√	√
24	*Euphaea cardinalis* (Fraser, 1924)	R	√	LC	–	–	–	–	√	–	–	–
25	*Euphaea fraseri* (Laidlaw,1920)	C	√	LC	√	–	√	√	–	√	√	–
Family Lestidae												
26	*Lestes concinnus* Hagen in Selys, 1862	NR	–	DD	√	√	√	√	–	–	–	√
27	*Lestes elatus* Hagen in Selys, 1862	VC	–	LC	√	√	√	√	√	√	√	√
28	*Lestes praemorsus decipiens* Kirby, 1893	R	–	LC	√	–	–	–	√	–	–	–
Family Platycnemididae												
29	*Caconeura ramburi* (Fraser, 1922)	C	–	DD	√	–	√	–	√	√	–	–
30	*Caconeura risi* (Fraser, 1931)	VC	√	DD	√	√	√	√	–	–	√	√
31	*Copera marginipes* (Rambur, 1842)	VC	–	LC	√	–	–	√	–	–	√	√
32	*Copera vittata* (Selys, 1863)	VC	–	LC	√	√	√	√	–	√	√	√
33	*Elattoneura tetrica* (Laidlaw, 1917)	R	√	LC	–	–	–	√	–	–	–	–
34	*Esme mudiensis* Fraser, 1931	NR	√	DD	√	–	–	–	√	√	–	–
35	*Onychargia atrocyana* (Selys, 1865)	NR	–	LC	√	–	–	√	–	–	√	–
36	*Prodasineura verticalis annandalei* (Fraser, 1921)	C	–	LC	√	√	–	√	–	√	√	√
Family Platystictidae												
37	*Indosticta deccanensis* Laidlaw, 1915	VR	√	VL	√	–	–	–	–	√	–	–

	Scientific name	ST	EN	RL	DR	ID	KL	KT	PM	RK	RM	UM
38	*Protosticta cyanofemora* Joshi, Subramanian, Babu & Kunte, 2020	VR	√	NA	–	–	–	–	√	–	–	–
39	*Protosticta gravelyi Laidlaw, 1915*	C	√	LC	√	√	√	√	–	√	√	√
40	*Protosticta rufostigma* Kimmins 1958	NR	√	DD	–	–	–	–	√	–	–	–
41	*Protosticta sanguinostigma* Fraser, 1922	C	√	VL	√	–	–	–	√	√	–	–
Sub-Order Anisoptera												
Family Aeshnidae												
42	*Anaciaeschna martini* Selys, 1897	VR	–	LC	–	–	–	–	√	–	–	–
43	*Anax ephippiger* (Burmeister, 1839)	C	–	LC	√	–	–	–	√	–	–	√
44	*Anax guttatus* (Burmeister, 1839)	VR	–	LC	√	–	–	–	–	–	–	–
45	*Anax immaculifrons* (Rambur,1842)	C	–	LC	√	√	√	√	√	√	√	√
46	*Gynacantha millardi* Fraser,1920	R	–	LC	√	–	–	√	–	√	√	√
47	*Gynacantha dravida* Lieftinck,1960	C	–	DD	√	√	√	√	–	–	√	√
Family Chlorogomphidae												
48	*Chlorogomphus xanthoptera* (Fraser, 1919)	R	√	VL	–	–	–	–	√	–	–	–
Family Corduliidae												
49	*Hemicordulia asiatica* (Selys, 1878*)*	C	–	LC	–	–	–	√	–	–	√	–
Family Gomphidae												
50	*Acrogomphus fraseri* Laidlaw, 1925	NR	√	DD	√	–	√	√	–	√	√	√
51	*Asiagomphus nilgiricus* Laidlaw, 1922	NR	√	DD	–	–	√	√	–	–	–	–
52	*Burmagomphus laidlawi* Fraser, 1924	NR	–	DD	–	–	–	–	√	–	–	–
53	*Burmagomphus pyramidalis* Laidlaw, 1922	NR	√	LC	–	–	–	–	√	–	–	–
54	*Cyclogomphus flavoannulatus* Rangnekar, Dharwadkar, Kalesh & Subramanian, 2019	VR	√	NA	–	–	–	√	–	–	–	–
55	*Cyclogomphus heterostylus* Selys,1854	VR	–	DD	–	–	–	√	–	–	–	–
56	*Gomphidia kodaguensis* Fraser, 1923	NR	√	DD	–	–	√	√	–	–	√	√
57	*Heliogomphus promelas* (Selys, 1873)	R	–	NT	–	–	–	–	√	–	–	–
58	*Ictinogomphus rapax* (Rambur, 1842)	C	–	LC	√	√	√	√	–	–	√	√
59	*Macrogomphus wynaadicus* Fraser, 1924	NR	√	DD	√	–	√	√	–	–	√	–
60	*Merogomphus tamaracherriensis* Fraser, 1931	NR	√	NA	–	–	–	–	√	–	–	–
61	*Melligomphus acinaces* (Laidlaw, 1922)	R	√	DD	–	–	√	√	–	–		–
62	*Paragomphus lineatus* (Selys,1850)	C	–	LC	–	√	√	√	–	√	√	√
Family Libellulidae												
63	*Acisoma panorpoides* Rambur, 1842	C	–	LC	√	√	–	√	–	–	√	√
64	*Aethriamanta brevipennis* (Rambur, 1842)	NR	–	LC	√	√	–	√	–	–	√	√
65	*Brachydiplax chalybea* Brauer, 1868	C	–	LC	√	√	–	√	–	–	√	√
66	*Brachydiplax sobrina* (Rambur, 1842)	NR	–	LC	√	–	–	√	–	–	–	–
67	*Brachythemis contaminata* (Fabricius, 1793)	VC	–	LC	√	√	–	√	–	–	√	√
68	*Bradinopyga geminata* (Rambur, 1842)	VC	–	LC	–	–	√	√	–	√	√	√
69	*Cratilla lineata calverti* (Forster, 1903)	C	–	LC	√	√	√	√	√	√	√	√
70	*Crocothemis servilia* (Drury, 1770)	NR	–	LC	–	–	–	√	–	–	√	√
71	*Diplacodes nebulosa* (Fabricius, 1793)	VR	–	LC	–	–	–	√	–	–	–	√
72	*Diplacodes trivialis* (Rambur, 1842)	VC	–	LC	√	√	√	√	√	√	√	√
73	*Epithemis mariae* (Laidlaw, 1915)	NR	√	LC	√	–	–	√	–	√	–	√
74	*Hydrobasileus croceus* (Brauer, 1867)	NR	–	LC	√	√	√	√	–	–	√	√
75	*Hylaeothemis apicalis* Fraser, 1924	NR	–	DD	√	√	√	√	√	√	√	√
76	*Indothemis carnatica* (Fabricius, 1798)	VR	–	NT	√	–	–	–	–	–	–	–
77	*Lathrecista asiatica* (Fabricius, 1798)	C	–	LC	√	√	√	√	–	–	√	√

	Scientific name	ST	EN	RL	DR	ID	KL	KT	PM	RK	RM	UM
78	*Lyriothemis tricolor* Ris, 1919	VR	–	LC	–	–	√	√	–	–	–	√
79	*Neurothemis fulvia* (Drury, 1773)	C	–	LC	√	–	–	√	–	–	√	√
80	*Neurothemis tullia* (Drury, 1773)	NR	–	LC	√	√	–	√	–	–	√	–
81	*Onychothemis testacea ceylanica* Ris, 1912	NR	–	LC	√	–	√	√	–	–	–	√
82	*Orthetrum chrysis* (Selys, 1891)	C	–	LC	√	√	√	√	–	√	√	√
83	*Orthetrum triangulare triangulare* (Selys, 1878)	NR	–	LC	–	–	–	–	√	√	–	–
84	*Orthetrum glaucum* (Brauer, 1865)	C	–	LC	√	√	√	√	√	√	√	√
85	*Orthetrum luzonicum* (Brauer, 1868)	C	–	LC	√	√	√	√	√	√	√	√
86	*Orthetrum pruinosum neglectum* (Rambur, 1842)	C	–	LC	√	√	√	√	√	√	√	√
87	*Orthetrum sabina sabina* (Drury, 1770)	VC	–	LC	√	√	√	√	√	√	√	√
88	*Paplopleura sexmaculata* (Fabricius, 1787)	NR	–	NA	√	√	√	√	–	–	√	√
89	*Pantala flavescens* (Fabricius, 1798)	VC	–	LC	√	√	√	√	√	√	√	√
90	*Potamarcha congener* (Rambur, 1842)	NR	–	LC	√	√	–	√	–	–	–	√
91	*Rhodothemis rufa* (Rambur, 1842)	C	–	LC	–	–	–	√	–	–	–	√
92	*Rhyothemis triangularis* Kirby, 1889	R	–	LC	–	–	–	√	–	–	–	–
93	*Rhyothemis variegata variegata* (Linnaeus, 1763)	C	–	LC	√	√	√	√	–	–	√	√
94	*Tetrathemis platyptera* Selys, 1878	NR	–	LC	√	–	–	√	–	√	–	√
95	*Tholymis tillarga* (Fabricius, 1798)	C	–	LC	√	√	√	√	–	–	√	√
96	*Tramea basilaris* (Palisot de Beauvois, 1805)	C	–	LC	√	√	√	√	–	–	√	√
97	*Tramea limbata* (Desjardins, 1832)	NR	–	LC	√	–	–	√	–	√	–	√
98	*Trithemis aurora* (Burmeister, 1839)	VC	–	LC	√	–	√	√	–	–	√	√
99	*Trithemis pallidinervis* (Kirby, 1889)	C	–	LC	–	√	–	√	–	√	–	√
100	*Trithemis festiva* (Rambur, 1842)	C	–	LC	√	√	√	√	–	√	√	√
101	*Urothemis signata* (Rambur, 1842)	VR	–	LC	–	–	–	√	–	–	–	√
102	*Zygonyx iris malabarica* Fraser, 1926	NR	–	LC	√	√	√	√	–	√	√	√
103	*Zyxomma petiolatum* Rambur, 1842	C	–	LC	–	√	–	√	–	√	√	√
Family Macromiidae												
104	*Epophthalmia vittata vittata* Burmeister, 1839	C	–	LC	√	–	–	√	–	–	–	√
105	*Epophthalmia frontalis binocellata* Fraser, 1936	VR	–	LC	√	–	–	–	–	–	–	√
106	*Macromia cingulata* Rambur, 1842	VR	–	LC	√	–	–	–	√	√	–	–
107	*Macromia ellisoni* Fraser, 1924	VR	√	LC	–	–	–	–	√	–	–	–
108	*Macromia flavocolorata* Fraser, 1924	VR	–	LC	–	√	–	√	–	–	√	√
109	*Macromia irata* Fraser, 1924	NR	√	LC	–	–	–	√	–	–	√	–
Genera Insertae Sedis												
110	*Idionyx corona* Fraser, 1921	VR	√	DD	–	–	–	–	√	√	–	–
111	*Idionyx galeata* Fraser, 1924	VR	√	EN	–	–	–	–	√	–	–	–
112	*Idionyx minima* Fraser, 1931	NR	√	DD	–	–	–	–	√	–	–	–
113	*Idionyx saffronata* Fraser, 1924	NR	√	DD	–	–	–	–	√	–	–	–
114	*Idionyx travancorensis* Fraser, 1931	NR	√	DD	√	–	–	–	√	–	–	–
115	*Idionyx gomantakensis* Subramanian, Rangnekar & Nayak, 2013	VR	√	NA	√	–	–	√	–	–	–	–
116	*Macromidia donaldi donaldi* (Fraser, 1924)	VR	√	LC	–	–	–	√	–	–	√	–
	TOTAL 116 species		33		72	48	46	88	35	46	61	69

*—The subspecies is endemic to WG (Kalkman et al. 2020) | ST—Occurrence status | EN—Taxon endemic status with respect to WG | RL—IUCN Red List Data | DR—Darbhakulam | ID—Idimuzhangan | KL—Kallar | KT—Kattalapara | PM—Pandimotta | RK—Rockwood | RM—Rosemala | UM—Umayar.

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