

ODONATA (INSECTA) FAUNA OF TAMAN NEGARA NATIONAL PARK, MALAYSIA

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ABSTRACT

Taman Negara National Park is divided into three parts according to states – Taman Negara Pahang, Taman Negara Kelantan and Taman Negara Terengganu. In this study we present the records of Odonata collected at Kuala Kelapoh, Taman Negara Pahang and Gua Bewah, Taman Negara Terengganu. A total of 61 species were recorded from Kuala Kelapoh and 52 species from Gua Bewah. Of these 46 species are the new records for Taman Negara National Park. The high number of new records in this study indicates the Odonata fauna of Taman Negara National Park was not well studied. Notable records from the study include *Coelliccia sameerae*, *Phyllothemis raymondi* and *Rhinocypha pelops*. The records from Kuala Kelapoh and Gua Bewah are combined with the existing records in literature to produce a checklist of the Odonata for Taman Negara National Park with 101 species from 15 families.

Keywords: Checklist, Dragonflies, Odonata, Peninsular Malaysia, Taman Negara National Park

ABSTRAK

Taman Negara dibahagikan kepada tiga bahagian mengikut negeri – Taman Negara Pahang, Taman Negara Kelantan dan Taman Negara Terengganu. Dalam kajian ini kita membentangkan rekod Odonata yang diperolehi di lokasi Kuala Kelapoh, Taman Negara Pahang dan Gua Bewah, Taman Negara Terengganu. Sebanyak 61 spesies telah direkodkan di Kuala Kelapoh dan 52 spesies di Gua Bewah. Daripada bilangan ini, 46 spesies merupakan rekod baharu untuk Taman Negara. Bilangan rekod baharu yang tinggi hasil daripada kajian ini menunjukkan bahawa kajian fauna Odonata Taman Negara agak kurang. Rekod yang menarik daripada kajian ini termasuk *Coelliccia sameerae*, *Phyllothemis raymondi* dan *Rhinocypha pelops*. Rekod dari Kuala Kelapoh dan Gua Bewah digabungkan dengan rekod daripada rujukan untuk menghasilkan satu senarai semakan Odonata untuk Taman Negara dengan 101 spesies yang tergolong dalam 15 famili.

Kata kunci: Senarai semak, Papatung, Odonata, Semenanjung Malaysia, Taman Negara.

INTRODUCTION

With a total area of 4343 km², Taman Negara National Park is located at the borders of three states in Peninsular Malaysia – Pahang, Terengganu and Kelantan, and it was established under three enactments in 1938 (Kelantan) and 1939 (Pahang and Terengganu) (Pakhriazad et al. 2009). The national park is divided into three parts according to the states – Taman Negara Pahang (2477 km²), Taman Negara Kelantan (1043 km²) and Taman Negara Terengganu (853 km²) (Pakhriazad et al. 2009). The vegetation of Taman Negara National Park ranges from lowland to highland. Gunung Tahan, the highest peak (2187 m) in Peninsular Malaysia, is located inside the park. Taman Negara National Park is covered by many small rivers, and three major rivers in Peninsular Malaysia are originated from the park, namely Sungai Kelantan, Sungai Terengganu and Sungai Tembeling (Momin Khan 1990).

The limited Odonata records of Taman Negara National Park are scattering in a few literatures, and the records could be traced as far back in 1921 (Laidlaw 1931). Records for Taman Negara Pahang can be found in Laidlaw (1931), Lieftinck (1965), Asahina (1984, 1986) and Kalkman (2004), and these records were mainly from Kuala Tahan along the hiking trail up to Gunung Tahan. The records from Taman Negara Kelantan were in Choong (2007), and these records were mainly from Kuala Koh. However, no records were available from Taman Negara Terengganu. All the three authors conducted sampling in Kuala Kelapoh, Taman Negara Pahang in 2015, and the first and second authors conducted sampling in Gua Bewah, Taman Negara Terengganu in 2017. The results of collecting are presented here. Together with a summary of the available literature records, we produce a checklist of Odonata known to Taman Negara National Park.

MATERIALS AND METHODS

Samplings were conducted during the inventory programmes by PERHILITAN at two sites in Taman Negara National Park. The sampling at Kuala Kelapoh (4°33'57.6"N, 102°34'54.8"E), Taman Negara Pahang was done on two occasions, i.e. 11–20 April and 5–8 August 2015. The sampling at Gua Bewah (4°50'44.7"N, 102°43'16.3"E), Taman Negara Terengganu was done on 19-28 September 2017. The Kuala Kelapoh site mainly consists of small streams (Sg. Kelapoh and Sg. Sat), swamps and marshes. On the other hand, the Gua Bewah site consists of the Kenyir Lake, small streams (Sg. Cacing, Sg. Chendana, Sg. Taat and Sg. Ketabang) and streamlets.

Adult insects (Odonata) were collected using handheld nets. Specimens were then preserved with acetone treatment and drying in silica gel. Classification of Odonata follows Dijkstra et al. (2013a) except that the family Argiolestidae follows Kalkman and Theischinger (2013) and Dijkstra et al. (2013b). The material collected is held in the Centre for Insect Systematics at Universiti Kebangsaan Malaysia (UKM) and the Institut Biodiversiti (IBD) at PERHILITAN, Bukit Rengit. Specimens were identified to species with the aid of a microscope, by reference to the relevant literature, and direct comparison with material from other places.

RESULTS

The Odonata species collected by us in Kuala Kelapoh, Taman Negara Pahang (column E) and Gua Bewah, Taman Negara Terengganu (column F) together with records found in

previously published literature (columns A-D) are presented in Table 1. A total of 61 species were recorded from Kuala Kelapoh on two sampling occasions and 52 species were recorded from Gua Bewah on one sampling occasion. The total number of species combined from both the sites was 83. Of these 46 species (marked with * in Table 1) are the new records for Taman Negara National Park. Some of the Odonata photos captured at Kuala Kelapoh and Gua Bewah are shown in Figure 1. The records from Kuala Kelapoh and Gua Bewah are combined with the existing records in literature to produce a checklist of the Odonata known to Taman Negara National Park. At present 101 Odonata species from 15 families are known to Taman Negara National Park (Table 1).

DISCUSSION

It is striking to note that of the 83 species collected, 46 species are new records for Taman Negara National Park, indicating Odonata fauna of the park is poorly known. The records for Taman Negara Kelantan is only available in Choong (2007) of which 23 species were recorded at Kuala Koh. The records for Taman Negara Pahang seem to be more comprehensive compared to Taman Negara Kelantan as they are scattering in a few literatures (Asahina 1984, 1986; Kalkman 2004; Laidlaw 1931; Lieftinck 1965). However, it must be noted that these records are mainly from sites at Kuala Tahan along the hiking trail up to Gunung Tahan, with a total number of 41 species being recorded. Our study site (Kuala Kelapoh) is located at the eastern part of Taman Negara Pahang, far from Kuala Tahan and Gunung Tahan sites, and we recorded 61 species (Table 1). We are not aware of any record from Taman Negara Terengganu. Therefore, the records from the sampling at Gua Bewah (Table 1; column F) are the very first records for Taman Negara Terengganu. We noted the records from Kuala Tahan in Ng et al. (2012). They stated clearly that the Kuala Tahan records are from Kampung Tahan and its surroundings outside Taman Negara Pahang, of which we did not include them in the list of Taman Negara National Park (Table 1). However, 14 species in Ng et al. (2012) are absent in the list of Taman Negara National Park, and many of these species are common species. We strongly believe that these common species would eventually be recorded in Taman Negara Pahang if more sampling efforts are put in. We also noted the records from Kenyir Lake in Choong et al. (2012). They recorded 20 species from Sg. Lasir, a feeder to Kenyir Lake, and Sg. Lasir is not far from Taman Negara Terengganu. Nevertheless, all the records from Sg. Lasir except *Drepanosticta quadrata* are present in the list of Taman Negara National Park (Table 1).

A few interesting species were recorded during the field surveys - *Coeliccia sameerae*, *Phyllothemis raymondi* and *Rhinocypha pelops*. All these are uncommon species. *Coeliccia sameerae* is a recently described species from Kenyir Lake, Terengganu (Dow et al. 2018). Laidlaw (1931) recorded *Coeliccia erici* from Sg. Teku (Taman Negara Pahang), and this record from Sg. Teku is actually *C. sameerae* which was misidentified (Dow et al. 2018). *Coeliccia sameerae* is endemic to Peninsular Malaysia, and its distribution is restricted to the eastern part of Titiwangsa Range (Dow et al. 2018). For Peninsular Malaysia, *P. raymondi* is only known from Taiping (Perak) and Pergau (Kelantan) (Choong et al. 2017a), and the record from Gua Bewah (Table 1) is the third location for this species in Peninsular Malaysia. On the other hand, *R. pelops* is only known from Bukit Larut (Perak) in Peninsular though this species is found in Thailand and Myanmar (Orr 2005). Therefore, the record from Gua Bewah (Table 1) is the second location of this species in Peninsular Malaysia. Orr (2005) claimed that this species is rare and elusive with little knowledge of its habitat. We

encountered a female of *R. pelops* in a streamlet at Gua Bewah, and when approached the female flew up high perching on a leaf of a banana plant by the streamlet.

At present 101 Odonata species are now known to occur at Taman Negara National Park. This represents 40% of the species known to Peninsular Malaysia (Choong et al. 2017b). It must be noted that all these records are mainly from a limited site in Taman Negara National Park. Taman Negara National Park is a large area of 4343 km², many parts of the park are still unexplored for Odonata. Therefore, much more efforts are needed to survey other parts of the park in order to produce a comprehensive species list for Taman Negara National Park. Taman Negara National Park is a pristine forest ecosystem, and the biodiversity data generated from this study could be used as a comparison study for degraded forest ecosystems as well as agricultural ecosystems (Zulkapli et al. 2008).

CONCLUSION

At present the Taman Negara National Park has 101 Odonata species, indicating the richness of Odonata fauna in Taman Negara National Park. This checklist provides a basis for future reference and study of Odonata diversity of Taman Negara National Park and other state parks in Peninsular Malaysia.

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APPENDICES

Table 1 Odonata species known from Taman Negara National Park. Column A is record from Choong (2007); column B is record from Kalkman (2004); column C is record from Laidlaw (1931); column D is record from Asahina (1984, 1986) and Lieftinck (1965); column E is record from samplings done at Kuala Kelapoh, Taman Negara Pahang; and column F is record from sampling done at Gua Bewah, Taman Negara Terengganu. * indicates new record for Taman Negara National Park.

No.	Species	A	B	C	D	E	F
Family Devadattidae							
1	<i>Devadatta argyoides</i> (Selys, 1859)			/			/
Family Chlorocyphidae							
2	<i>Aristocypha fenestrella</i> (Selys, 1859)			/			/
3	<i>Heliocypha biforata</i> (Selys, 1859)	/				/	/
4	<i>Heliocypha perforata limbata</i> (Selys, 1879)	/		/		/	
5	<i>Libellago lineata</i> (Burmeister, 1839)	/				/	/
6	<i>Libellago semiopaca</i> (Selys, 1873)	/		/		/	
7	* <i>Libellago stigmatizans</i> (Selys, 1859)					/	
8	* <i>Rhinocypha pelops</i> Laidlaw, 1936						/
Family Calopterygidae							
9	* <i>Echo modesta</i> Laidlaw, 1902						/
10	<i>Neurobasis chinensis</i> (Linnaeus, 1758)	/	/	/		/	/
11	* <i>Vestalis amethystina</i> Hagen, 1887					/	/
12	<i>Vestalis amoena</i> Selys, 1853	/		/		/	/
Family Euphaeidae							
13	<i>Dysphaea dimidiata</i> Selys, 1853	/	/	/		/	/
14	* <i>Euphaea impar</i> Selys, 1859					/	/
15	<i>Euphaea ochracea</i> Selys, 1859			/		/	/
Family Philosinidae							
16	* <i>Rhinagrion microcephalum</i> (Selys, 1862)					/	
17	<i>Rhinagrion viridatum</i> Fraser, 1938			/		/	/
Family Argiolestidae							
18	<i>Podolestes orientalis</i> Selys, 1862			/			
Family Platystictidae							
19	* <i>Drepanosticta fontinalis</i> Lieftinck, 1937						/
20	<i>Drepanosticta hamadryas</i> Laidlaw, 1931			/	/		
21	<i>Drepanosticta sharpi</i> (Laidlaw, 1907)			/			
22	* <i>Protosticta curiosa</i> Fraser, 1934						/
Family Lestidae							
23	* <i>Lestes dorothea</i> Fraser, 1924					/	
24	* <i>Lestes praemorsus decipiens</i> Kirby, 1893					/	
25	<i>Orolestes wallacei</i> (Kirby, 1889)			/		/	
Family Coenagrionidae							
26	* <i>Agriocnemis femina</i> (Brauer, 1868)					/	
27	* <i>Archibasis rebecca</i> Kemp, 1989					/	
28	* <i>Agriocnemis rubescens rubeola</i> Selys, 1877					/	

29	* <i>Argiocnemis</i> sp.#			/	/
30	* <i>Ischnura senegalensis</i> (Rambur, 1842)				/
31	* <i>Mortonagrion aborensis</i> (Laidlaw, 1914)			/	
32	* <i>Pericnemis ?stictica</i> Selys, 1863			/	
33	* <i>Pseudagrion microcephalum</i> (Rambur, 1842)				/
34	* <i>Pseudagrion rubriceps</i> Selys, 1876			/	
35	* <i>Pseudagrion williamsoni</i> Fraser, 1922				/
Family Platycnemididae					
36	* <i>Calicnemia chaseni</i> (Laidlaw, 1928)				/
37	<i>Coeliccia albicauda</i> (Forster, 1907)			/	/
38	<i>Coeliccia didyma</i> (Selys, 1863)			/	/
39	<i>Coeliccia sameerae</i> Dow, Choong & Ng, 2018		/		/
40	* <i>Copera marginipes</i> (Rambur, 1842)				/
41	<i>Copera vittata</i> (Selys, 1863)	/	/		/
42	<i>Elattonaura analis</i> (Selysm 1860)			/	/
43	<i>Indocnemis orang</i> Forster, 1907			/	/
44	* <i>Prodasineura collaris</i> (Selys, 1860)				/
45	<i>Prodasineura humeralis</i> (Selys, 1860)			/	/
46	* <i>Prodasineura laidlawi</i> (Forster, 1907)				/
47	<i>Prodasineura notostigma</i> (Selys, 1860)			/	
Family Gomphidae					
48	<i>Burmagomphus insularis</i> Laidlaw, 1914	/			
49	<i>Burmagomphus williamsoni</i> Forster, 1914		/		
50	* <i>Gomphidia abbotti</i> Williamson, 1907				/
51	<i>Gomphidictinus perakensis</i> (Laidlaw, 1902)		/		
52	* <i>Ictinogomphus decoratus melaenops</i> (Selys, 1858)				/
53	<i>Macrogomphus parallelogramma albardae</i> Selys, 1878	/			
54	<i>Macrogomphus quadratus</i> Selys, 1878	/			
55	* <i>Megalogomphus sumatranus</i> (Kruger, 1899)				/
56	<i>Paragomphus capricornis</i> (Forster, 1914)	/			
57	* <i>Phaenandrogomphus asthenes</i> Lieftinck, 1964				/
Family Corduliidae					
58	<i>Hemicordulia tenera</i> Lieftinck, 1930		/		
Family Macromiidae					
59	* <i>Macromia cydippe</i> Laidlaw, 1922				/
Family Aeshnidae					
60	<i>Anax guttatus</i> (Burmeister, 1839)		/		
61	<i>Gynacantha basiguttata</i> Selys, 1882	/			/
62	<i>Gynacantha bayadera</i> Selys, 1891	/			
63	<i>Gynacantha limbalis</i> Karsch, 1892	/			/
64	<i>Gynacantha subinterrupta</i> Rambur, 1842		/		
65	<i>Indaeschna grubaueri</i> (Forster, 1904)	/	/		/
Family Libellulidae					
66	* <i>Acisoma parnopooides</i> Rambur, 1842			/	/
67	* <i>Agrioptera insignis</i> (Rambur, 1842)			/	/
68	* <i>Brachydiplax farinosa</i> Kruger, 1902			/	
69	* <i>Brachythemis contaminata</i> (Fabricius, 1793)				/

70	* <i>Camacinia gigantea</i> (Brauer, 1867)					/
71	<i>Cratilla lineata</i> (Brauer, 1878)	/				/
72	<i>Cratilla metallica</i> (Brauer, 1878)		/			/ /
73	<i>Diplacodes trivialis</i> (Rambur, 1842)		/			/ /
74	* <i>Indothemis limbata</i> (Selys, 1891)					/
75	* <i>Lathrecista asiatica</i> (Fabricius, 1798)					/ /
76	<i>Lyriothemis biappendiculata</i> (Selys, 1891)	/		/		/ /
77	<i>Lyriothemis cleis</i> Brauer, 1868	/		/		
78	* <i>Neurothemis fluctuans</i> (Fabricius, 1793)					/ /
79	* <i>Neurothemis fulvia</i> (Drury, 1773)					/
80	<i>Onychothemis culminicola</i> Forster, 1904			/		/
81	* <i>Onychothemis testacea</i> Laidlaw, 1902					/
82	<i>Orthetrum chrysis</i> (Selys, 1891)	/				/ /
83	<i>Orthetrum glaucum</i> (Brauer, 1865)		/	/		/
84	<i>Orthetrum luzonicum</i> (Brauer, 1868)	/				/
85	<i>Orthetrum sabina</i> (Drury, 1770)		/			/ /
86	<i>Orthetrum testaceum</i> (Burmeister, 1839)	/				/ /
87	<i>Pantala flavescens</i> (Fabricius, 1798)		/			/ /
88	* <i>Phyllothemis raymondi</i> Lieftinck, 1950					/
89	* <i>Potamarcha congener</i> (Rambur, 1842)					/
90	* <i>Pseudothemis jorina</i> Forster, 1904					/
91	* <i>Rhyothemis phyllis</i> (Sulzer, 1776)					/
92	<i>Rhyothemis plutonia</i> Selys, 1883			/		
93	* <i>Tetrathemis irregularis hyalina</i> Kirby, 1889					/ /
94	* <i>Tetrathemis platyptera</i> Selys, 1878					/
95	* <i>Tramea transmarina euryale</i> Seelys, 1878					/
96	<i>Trithemis aurora</i> (Burmeister, 1839)	/	/			/ /
97	<i>Trithemis festiva</i> (Rambur, 1842)	/				/ /
98	<i>Tyriobapta torrida</i> Kirby, 1889		/			/ /
99	<i>Zygonyx ida</i> Selys, 1869			/		
100	<i>Zygonyx iris malayana</i> (Laidlaw, 1902)			/		/
Family: <i>Incertae sedis</i>						
101	<i>Macromidia genialis</i> Laidlaw, 1923			/		
Total number		23	11	31	4	61 52

Argiocnemis sp. is a problematic taxon found commonly in Peninsular Malaysia and Borneo, and it may already have a valid name currently suppressed in the synonym of that species.



Figure 1 Some Odonata photos taken at Taman Negara National Park. A. *Gynacantha limbalis*, B. *Rhinagrion viridatum*, C. *Libellago semiopaca*, D. *Rhinagrion microcephalum*, E. *Coeliccia sameerae*, F. *Rhyothemis phyllis*, G. *Echo modesta* and H. *Orthetrum luzonicum*. Photos A-E were taken at Kuala Kelapoh and F-H were taken at Gua Bewah.