

ODONATA (CLASS INSECTA) OF SUNGKAI WILDLIFE RESERVE, PERAK, MALAYSIA

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ABSTRACT

Protected areas need to be continuously monitored for their flora and fauna for the ecosystem management and conservation purposes. Odonata is a good bio-indicator for habitat monitoring; they are ecologically conspicuous and sensitive to environmental changes. A two-day survey was done at Sungkai Wildlife Reserve (SWR), Perak in June 2014 to record the odonate diversity of the areas. Twenty-one species from seven families were collected, namely Libellulidae with seven species, Protoneuridae and Chlorocyphidae (four species each), Calopterygidae and Euphaeidae (two species each), and Platycnemididae and Coenagrionidae with a single species respectively. Despite the short collection period, this area showed a rich odonate fauna but further survey is needed to obtain a complete picture. The results formed the first checklist of odonate fauna here and may serve as baseline information for future research towards habitat monitoring, conservation and management of SWR.

Keywords: Odonata, Dragonflies, Damselflies, Sungkai Wildlife Reserve, Perak, Malaysia

INTRODUCTION

Protected areas that composed of high diversity of flora and fauna need to be continuously monitored for ecosystem management and conservation. This is important to protect the natural resources including water, soils and plants plus animal from depleting or extinction. Continuous monitoring should help checking and tracking any changes in the number of species would be present there, subsequently estimating their richness in the future (Colwell & Coddington, 1994). Moreover, result from preliminary study can be used as a guide or base and the data can be used in the future study about the ecology and biology of species present. Invertebrate group such as dragonfly has been frequently used as a subject for bio-indicator in monitoring the environment and was recommended by several researchers (Takamura *et al.*, 1991; Hardersen, 2000; Catling, 2005) for such purposes.

Odonate fauna, either in the larvae forms utilising aquatic environment or as an adult living close to the water bodies, has been used as ecological tools to indicate the impact of human activity to aquatic and terrestrial environment due to its sensitivity towards anthropogenic activities (Kadoya *et al.*, 2009; Reece *et al.*, 2009 ; Fulan *et al.*, 2010) and climate change (Hickling *et al.*, 2005; Settele *et al.*, 2010); In many occasions, dragonfly adults utilising almost all kinds of habitats such as ponds, lakes, rivers, streams, bogs, swamps, marshes (Das *et al.*, 2012) and also depend on vegetation structures plus the presence of shaded areas (Claunitzer *et al.*, 2009) to do their activities including predator avoiding and breeding. The habitats of dragonflies that depend on the water and vegetation are important and can be further used to relate to the health of the environment. Hence, this also can be done here at Sungkai Wildlife Reserve (SWR) with the aim to examine habitat changes over time. Therefore, the aim of this study is to provide a baseline data on adult dragonfly in SWR that can be used for such purposes.

METHODOLOGY

Study area

This study was conducted along several small streams within the Sungkai Wildlife Reserve (SWR), Perak for two days. We surveyed part of Sungai Bikam (N 4° 2' 45.8268" E 101° 17' 50.9382") that flowing in between the oil palm plantation on one side and the protected SWR on the other sides. The water was somewhat cloudy since it was raining for some times before the sampling was done. Water is cold and about 1 m deep. Stream bottom was dominated by sand and woody debris present in the stream and along stream banks. Banks were covered by shrubs but in certain areas were totally exposed. The second stream surveyed was Sungai Ped (N 4° 1' 54.1878" E 101° 22' 9.7242") a small stream flowing through the well shaded forests. Water flows smoothly, cold, clear and shallow allowing light to penetrate to the bottom of the stream bed. Bottom substrate mainly gravels and sand can be found interspersing them. Stream banks were covered by forest.

Data collection

Samples were collected from temporary and permanent waters nearby the study areas plus along Sungai Bikam and Sungai Ped using sweep net. All specimens collected were identified to the species level using guide of Orr (2005) and Bun *et al.* (2012) based on morphology description of adult dragonfly.

RESULTS AND DISCUSSION

A total of 21 species of odonates fauna belonging to 18 genera and seven families, namely Calopterygidae, Chlorocyphidae, Coenagrionidae, Euphaeidae, Platycnemididae, Protoneuridae and Libellulidae were collected from the two streams at Sungkai Wildlife Reserve (Table 1). Majority species recorded belongs to the family Libellulidae (seven species), followed by Chlorocyphidae and Protoneuridae (four species each), families Calopterygidae and Euphaeidae (two species) and families Coenagrionidae and Platycnemididae (one species). Species from Libellulidae are mostly found around open habitats, especially still water, such as drain, ponds and marshes. Some species tend to glide and hover in open area for hours, especially for the broad wings species like *Zygonyx iris* (Orr, 2005; Bun *et al.*, 2010).

Sungai Bikam has 13 species from seven families and 12 species from five families were recorded at Sungai Ped. At Sungai Bikam, most species recorded belong to family Libellulidae (four species), followed by Calopterygidae, Chlorocyphidae and Euphaeidae with two species each and the other three families (Coenagrionidae, Platycnemididae and Protoneuridae) with only one species. At Sungai Ped, families Chlorocyphidae, Protoneuridae and Libellulidae shared the highest number of species (three species), followed by families Euphaeidae with two and one species from family Calopterygidae.

In term of species make up, species recorded in Sungai Bikam was slightly different with Sungai Ped, this may be due to the microhabitat heterogeneity such as the presence riparian vegetation, river substrates and perching site that influence the species assemblages that may give different result at both study sites (Wahizatul *et al.*, 2006). Several studies suggested that species assemblages were strongly influenced by the type of vegetation presence at the study sites (Villanueva & Mohagan 2010; Carvalho *et al.*, 2013). We also noticed that close canopy situation exists at Sungai Ped could possibly be the explanation why species recorded here is less similar to Sungai Bikam. Of the 21 species recorded in this study, only four species from three families were recorded at both sites. *Vestalis amoena*

(Calopterygidae), *Libellago stigmatizans* (Chlorocyphidae), *Dysphaea dimidiata* (Euphaeidae) and *Euphaea impar* (Euphaeidae) were found at both streams while the rest of the species only occurred at the respective stream.

ANNOTATED CHECKLIST

Calopterygidae

Neurobasis chinensis (Linnaeus, 1758)

The most conspicuous and widespread calopterygid species found at the fast flowing rivers and streams. Establishing territories and perching on boulders or marginal vegetation in the study areas.

Vestalis amoena (Selys, 1853)

Found abundant at Sungai Bikam. A common calopterygid found in areas with sandy bottom, clear, slow running lowland or montane streams in the Peninsular Malaysia (Norma-Rashid *et al.*, 1996). Can be found perching on the stone, leave and bog in the study area. Habitually occur in primary forest and widespread in Peninsular Malaysia, Sumatra and southern Thailand (Orr, 2005).

Chlorocyphidae

Heliocypha biforata (Selys, 1859)

Highly territorial species that abundantly observed in Sungai Ped. A common species that can be found in clear water forested stream with sandy bottom. Perching on the vegetation, stone and floating log. Can occur anywhere from small stream to broad area in clear and running water, it is widespread in tropical Asia (Orr, 2005).

Libellago lineata (Burmeister, 1839)

The most common species from the genus *Libellago* which inhabit the forest and cultivated areas. However, only found at Sungai Ped. It is a common species in lowland stream and rivers, widespread all over tropical Asia (Orr, 2005).

Libellago stigmatizans (Selys, 1859)

An uncommon species that can be found in small streams. It was believed to be able to adapt to living in forest and cultivated area such as oil palm plantation. May be extinct in Singapore, but can be found in many places in Peninsular Malaysia, southern Thailand and some part of Sumatra.

Sundacypha petiolata (Selys, 1859)

An uncommon species that was found in small drainage somewhere near to Sungai Ped. Observed territorial in packed of leaf. A lowland species that inhibited in sluggish, alluvial brooks and clear stream. Widespread in Sundaland (Orr, 2005).

Coenagrionidae

Pseudagrion pruinosum (Burmeister, 1839)

Recorded in Sungai Bikam. A tolerant species to anthropogenic disturbance that preferred shaded area and also can be found in stream near the cultivated area. Widespread in Sundaland and mainland Asia (Orr, 2005).

Euphaeidae

Dysphaea dimidiata (Selys, 1853)

Common in lowland area. Prefer shady, stagnant and slow moving water especially grasses near streams and drain. It can adapt to forest and river near cultivated areas. Territorial, can be seen perched on log and leaf from midday until evening in study area. Widespread in Sundaland and Thailand (Orr, 2005)

Euphaea impar (Selys, 1859)

Mostly occur in shaded forest streams, perching on twigs, marginal and overhanging vegetation.

Platycnemididae

Copera marginipes (Rambur, 1842)

Can be found in the range from dense forest to cultivated areas, mostly can be found near slow-flowing streams. Preferred area with substrate comprised of pebbles, sand and mud. Widespread in Sundaland (Orr, 2005).

Protoneuridae

Ellatoneura analis (Selys, 1860)

Found abundantly at Sungai Ped, mostly preferred small stream and sluggish lowland forest stream with *Pandanus* (Orr, 2005).

Prodasineura humeralis (Selys, 1860)

Found only at Sungai Bikam, it is a common species. Based Orr (2005), this species was widespread in forest streams in various habitats.

Prodasineura laidlawii (Forster, 1907)

Found only at Sungai Ped, prefer shaded and clear forest stream.

Prodasineura notostigma (Selys, 1860)

Found at Sungai Ped, prefer clear forest stream, 0-1000m from sea level (Orr, 2005).

Libellulidae

Indothemis limbata (Selys, 1891)

Found at Sungai Bikam, rare and local favour over open water.

Neurothemis fluctuans (Fabricius, 1793)

Found near Sungai Ped. Prefer and very common in lakes, open area, drains and marshes.

Onychothemis culminicola (Forster, 1904)

Found at Sungai Ped. Prefer slower water with a sandy bottom. Widespread in Sundaland (Orr, 2005)

Orthetrum chrysis (Selys, 1891)

A very common and widespread species among the genus *Orthetrum*. Can be tolerant to the anthropogenic activities.

Trithemis festiva (Rambur, 1842)

Found at Sungai Bikam. Common in larger streams and open area. Prefer swift and clear water.

Tyriobapta torrida (Kirby, 1889)

Found at Sungai Ped, prefer shaded area, not often perch on substrate, mostly will perch on stone. Inhibits forest swamp, slowing forest stream and marches. Confined to Sundaland.

Zygonyx iris (Laidla, 1902)

Found at Sungai Bikam, prefer open and clear streams in forest. Flies fast, rapidly and seldom perch.

CONCLUSION

Twenty-one species from seven families of adult dragonflies were collected in two days through quick survey method indicated that Sungkai Wildlife Reserve may harboured rich odonate fauna but further survey is needed to obtain a complete picture of dragonfly fauna here. This result formed the first checklist of odonate fauna of Sungkai Wildlife Reserve and may serve as baseline information for future research towards habitat monitoring, conservation and management of SWR.

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Table 1. List of Odonata from Sungai Bikam and Sungai Ped in Sungkai Wildlife Reserve (SWR), Perak

Species collected	Sungai Bikam	Sungai Ped	Shared species
Zygoptera			
Calopterygidae			
1. <i>Neurobasis chinensis</i>	×		
2. <i>Vestalis amoena</i>	×	×	×
Chlorocyphidae			
3. <i>Heliocypha biforata</i>		×	
4. <i>Libellago lineate</i>	×		
5. <i>Libellago stigmatizans</i>	×	×	×
6. <i>Sundacypha petiolata</i>		×	
Coenagrionidae			
7. <i>Pseudagrion pruinosum</i>	×		
Euphaeidae			
8. <i>Dysphaea dimidiate</i>	×	×	×
9. <i>Euphaea impar</i>	×	×	×
Platycnemididae			
10. <i>Copera marginipes</i>	×		

Protoneuridae

11. <i>Ellatoneura analis</i>		×
12. <i>Prodasineura humeralis</i>	×	
13. <i>Prodasineura laidlawii</i>		×
14. <i>Prodasineura notostigma</i>		×

Anisoptera

Libellulidae

15. <i>Indothemis limbata</i>	×	
16. <i>Neurothemis fluctuans</i>		×
17. <i>Onychothemis culminicola</i>	×	
18. <i>Orthetrum chrysis</i>		×
19. <i>Trithemis festiva</i>	×	
20. <i>Tyriobapta torrida</i>		×
21. <i>Zygonyx iris</i>	×	

Total species	13	12	4
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