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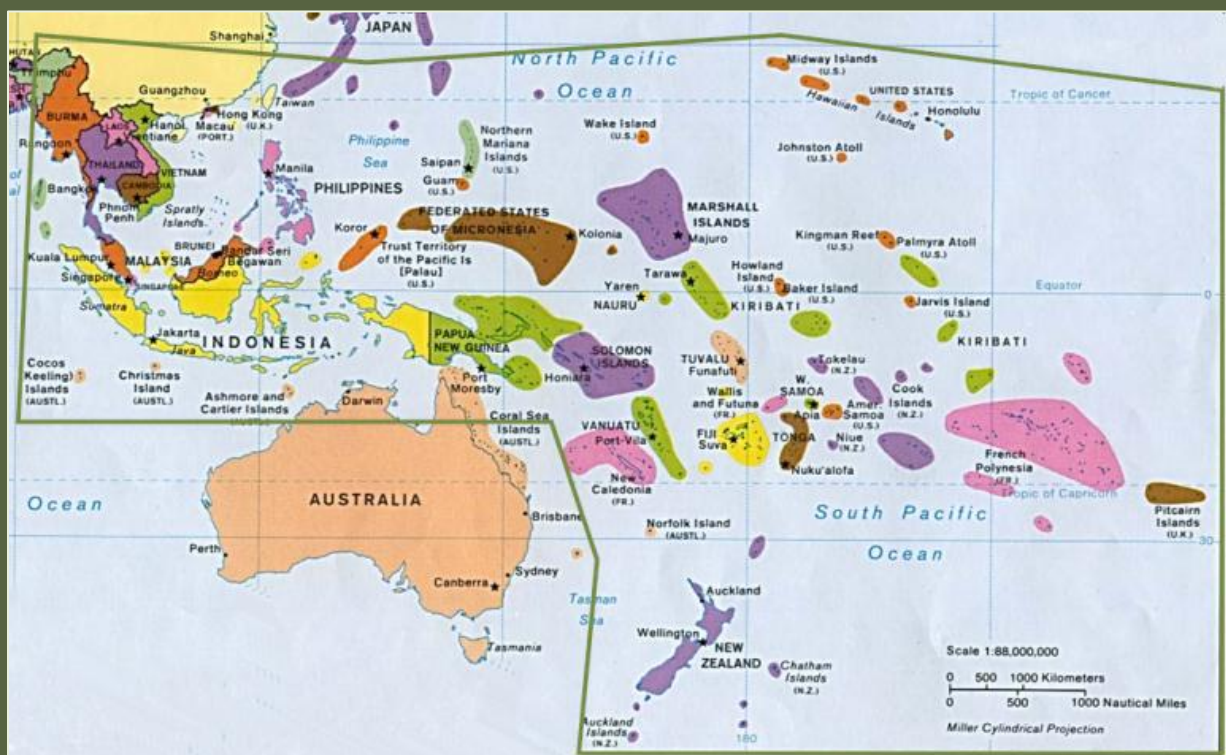
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Odonata of Ayer Hitam Forest Reserve, Johor, Peninsular Malaysia

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Abstract

Odonata records from Ayer Hitam Forest Reserve and the surrounding area in Johor, Peninsular Malaysia are presented. A total of 44 Odonata species from eight families were collected in the area in October 2012. All of these records are new to Ayer Hitam Forest Reserve. *Indothemis carnitica* is a new record for Malaysia.

Abstract in Malay

Rekod Odonata dari Hutan Simpan Ayer Hitam dan sekitarnya di Johor, Semenanjung Malaysia dibentangkan. Sejumlah 44 spesies Odonata daripada lapan famili telah dikutip dari kawasan tersebut dalam bulan Oktober 2012. Kesemua rekod yang diperolehi merupakan rekod baru bagi Hutan Simpan Ayer Hitam. *Indothemis carnitica* merupakan rekod baru bagi Malaysia.

Key words: Odonata, Ayer Hitam Forest Reserve, Johor, Peninsular Malaysia

Introduction

Ayer Hitam Forest Reserve (AHFR) is located at the north western Johor state, 30 km away from Pagoh town (Figure 1). Covering an area of 3800 ha, AHFR is the last remaining patch of peat swamp forest in Johor. Persistent lobbying by Wetlands International Malaysia has recently resulted in this small forest reserve becoming a state park. Generally, AHFR is adversely affected by drainage, adjacent oil palm plantations and vegetable farms, a small bauxite mine (operation ceased in 2011) inside the forest, and an open area for electricity pylons. The massive drainage system bordering the forest reserve is particularly damaging, drawing away the peat water from the forest, leaving the peat swamp forest dry (Figure 2).



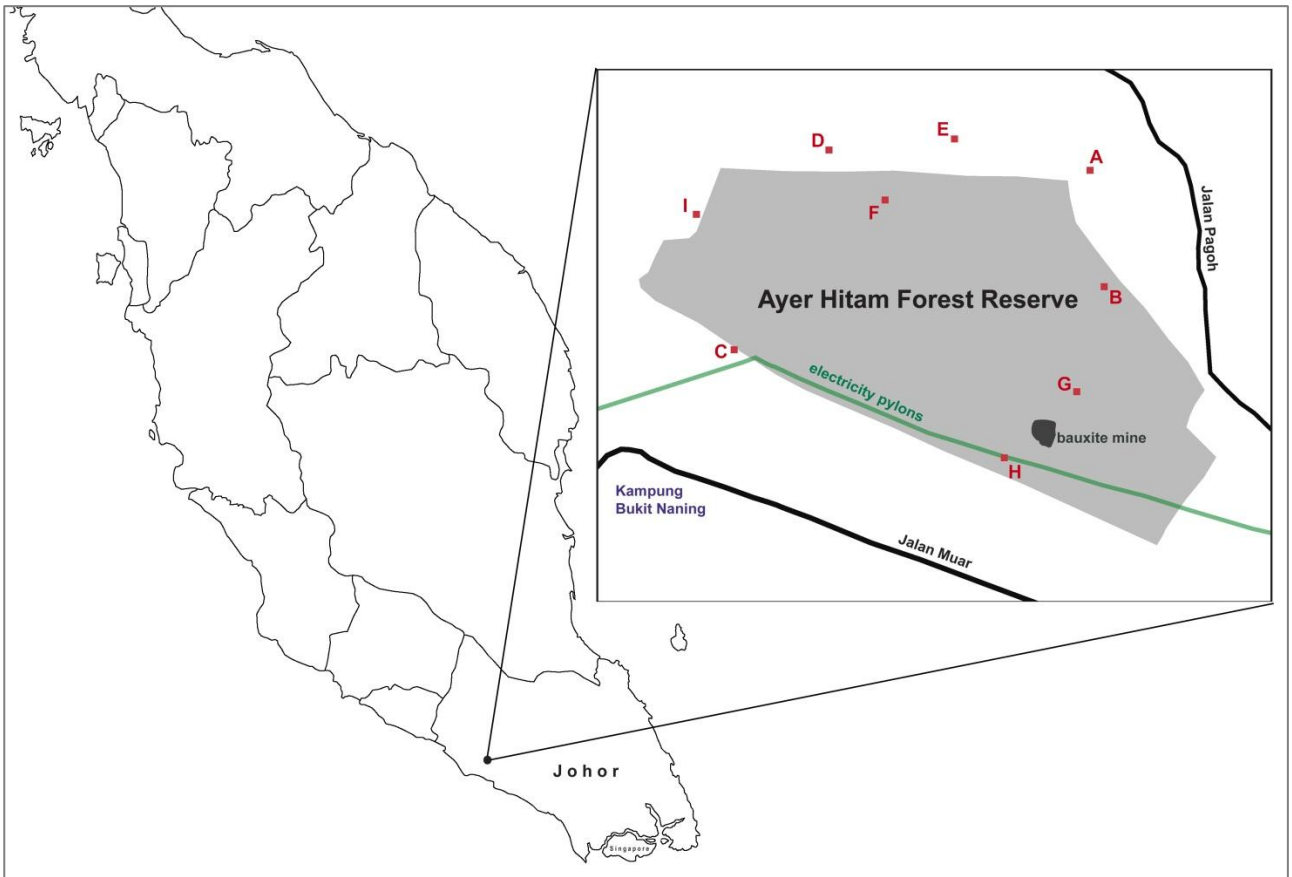


Figure 1. Sampling sites in Ayer Hitam Forest Reserve and its surroundings.



Figure 2. The peat swamp forest in AHFR is dry due to massive drainage system bordering the forest.

Johor is one of the better studied states in Peninsular Malaysia for Odonata. Recent published records of Odonata from the state are available for Gunung Ledang (Norma-Rashid et al. 1996), Endau Rompin Johor (Wilson & Gibert 2005), Panti Forest Reserve (Choong 2009) and various locations (Kitagawa & Katatani 2007). The first author also did inventory work at Gunung Belumut, Johor in 2012 (results will be reported elsewhere). Older records can be found in Hämäläinen (2000), Kemp (1989), Laidlaw (1925, 1931), Lieftinck (1929, 1932, 1954, 1964, 1965), van Tol & Norma-Rashid (1995), Ris (1909, 1911, 1912, 1919, 1930a, 1930b), Selys (1859, 1860, 1886, 1891), Vick (1993) and Watanabe (2003). The primary types of a number of species were collected in Johor: *Heliocypha biforata* (Selys), *Libellago hyaline* (Selys), *L. stigmatizans* Selys, *Euphaea impar* Selys, *E. ochracea* Selys (all described in Selys (1859)) and *Microgomphus chelifera* (Selys) (Selys & Hagen 1858) from Mt. Ophir (the old name of Gunung Ledang), *Acrogomphus malayanus* Laidlaw (Laidlaw 1925) from Pulau Aor, off the east coast of Johor, and *Burmagomphus plagiatus* Lieftinck (Lieftinck 1964) from Sungai Mupor.

Until now no inventory of Odonata of AHFR had been published. However, we are understood that the Odonata of AHFR was briefly surveyed through photographs taken by Wetlands International staff from the head office (the Netherlands) on two occasions in November 2010 and July 2012. Apart from these attempts, we are not aware of any Odonata records from AHFR. This report describes the results of collecting dragonflies and damselflies carried out at AHFR on 5-8 October 2012 and presents an inventory of the Odonata known from the site.

Methods

Adult Odonata were collected by using hand held nets and identified using relevant literature, and by comparison with material in the collection of the first author. The sampling was done on 5-8 October 2012. All of the collected specimens are in the possession of first author.

Locations

Collecting and observation of Odonata were carried out at locations in the forest reserve and some locations in its surroundings. The sampling locations are shown in Figure 1.

- A. A pond at the forest edge and a small swamp in the forest adjacent to the pond. Outside the forest at this point is an oil palm plantation bordered with small drainages.



- B. A few ponds in an oil palm plantation at the forest edge and muddy streamlets inside the forest.
- C. A small muddy streamlet inside the forest and a small drainage at the forest edge.
- D. An open swamp inside the forest area and drainages at the forest edge adjacent to a vegetable farm.
- E. Large ponds, canals and drainages at an open area of the forest edge.
- F. An ex-logging road flooded with water from the peat swamp forest (Figure 3).
- G. An abandoned bauxite mining site with canals and drainages bordering peat swamp forest (Figure 4).
- H. Shallow standing water along the electricity line bisects the forest reserve (Figure 5).
- I. A small drainage inside forest.



Figure 3. An ex-logging road flooded by water (site F).

Results

A total of 44 Odonata species from eight families were collected in the AHFR and its surroundings in October 2012. All the records are new to AHFR. The classification of families used here follows Orr (2005).



Figure 4. The drainage system drawing water out from the peat swamp forest (site G).



Figure 5. A pond under the electricity pylons (site H).



ZYGOPTERA

Chlorocyphidae

- *Libellago hyalina* (Selys, 1859) – A ♂, 5-X.

Megapodagrionidea

- *Podolestes buwaldai* Lieftinck, 1940 – G ♀, 7-X.
- *Podolestes orientalis* Selys, 1862 – G ♀, 7-X.

Coenagrionidae

- *Amphicnemis gracilis* Krüger, 1898 – I ♀, 8-X.
- *Archibasis viola* Lieftinck, 1949 – B ♂, tandem pair, 5-X; F ♂, 6-X.
- *Argiocnemis rubescens rubeola* Selys, 1877 – A ♂, 5-X.
- *Ceriagrion cerinorubellum* (Brauer, 1865) – A 2♂, 5-X; E tandem pair, 6-X.
- *Pseudagrion microcephalum* (Rambur, 1842) – A 3♂, ♀, tandem pair, 5-X; E ♂, 6-X; G ♂, 7-X.
- *Pseudagrion rubriceps* Selys, 1876 – E ♂, 6-X.
- *Pseudagrion williamsoni* Fraser, 1922 – A ♂, 5-X; F tandem pair, 6-X.

Platycnemididae

- *Copera ciliata* (Selys, 1863) – A ♀, 5-X.
- *Copera marginipes* (Rambur, 1842) – B ♂, 5-X.
- *Copera vittata* (Selys, 1863) – B ♂, 5-X.

Protoneuridae

- *Elattoneura aurantiaca* (Selys, 1886) – C 2♂, 5-X.
- *Prodasineura humeralis* (Selys, 1860) – B ♂, 5-X.

ANISOPTERA

Gomphidae

- *Ictinogomphus decoratus melaenops* (Selys, 1858) – A 2♂, 5-X.

Corduliidae

- *Epophthalmia vittigera* (Rambur, 1842) – F ♂, 6-X.

Libellulidae

- *Acisoma panorpoides* Rambur, 1842 – D ♂, 6-X.
- *Brachydiplax chalybea* Brauer, 1868 – A ♂, 5-X; B ♂, 5-X.
- *Brachygonia oculata* (Brauer, 1878) – F ♂, ♀, 6-X.
- *Brachythemis contaminata* (Fabricius, 1793) – B ♂, 5-X.
- *Chalybeothemis fluviatilis* Lieftinck, 1933 – H ♂, 8-X.
- *Indothemis carnatica* (Fabricius, 1798) – H 3♂, tandem pair, 8-X.

- *Nannophya pygmaea* Rambur, 1842 – D ♂, ♀, 6-X.
- *Neurothemis fluctuans* (Fabricius, 1793) – A ♂, ♀, 5-X.
- *Orchithemis pulcherrima* Brauer, 1878 – A ♂, 5-X; C 3♂, 5-X.
- *Orthetrum chrysis* (Selys, 1891) – E ♂, 6-X.
- *Orthetrum sabina* (Drury, 1770) – B ♂, 5-X; D ♂, 6-X.
- *Orthetrum testaceum* (Burmeister, 1839) – A ♂, 5-X.
- *Pantala flavescens* (Fabricius, 1798) – B ♂, 5-X.
- *Pornothemis serrata* Krüger, 1902 – F ♂, 6-X.
- *Potamarcha congener* (Rambur, 1842) – B 2♂, ♀, 5-X.
- *Pseudothemis jorina* Förster, 1904 – A ♀, 5-X.
- *Rhodothemis rufa* (Rambur, 1842) – B ♂, 5-X; F ♂, 6-X.
- *Rhyothemis aterrima* Selys, 1891 – E ♂, 6-X; G 2♂, 7-X.
- *Rhyothemis obsolescens* Kirby, 1889 – A ♂, 5-X; C ♂, 5-X.
- *Rhyothemis phyllis* (Sulzer, 1776) – D ♀, 6-X.
- *Rhyothemis triangularis* Kirby, 1889 – G 2♂, 7-X.
- *Risiophlebia dohrni* (Krüger, 1902) – F ♂, 6-X.
- *Tetrathemis irregularis hyalina* Kirby, 1889 – B ♂, 5-X.
- *Tholymis tillarga* (Fabricius, 1798) – B ♂, 5-X.
- *Trithemis aurora* (Burmeister, 1839) – A ♂, 5-X.
- *Tyriobapta torrida* Kirby, 1889 – G ♂, 7-X.
- *Urothemis signata insignata* (Selys, 1872) – E ♂, 6-X; G ♂, 7-X.

Discussion

It must be noted that the collecting period (5-8 October 2012) was short, and that the inventory work did not cover the whole forest reserve, particularly most of the inner forested part of AHFR was unexplored during the sampling period. Even though the inner forested part of the forest may be dry due to the massive drainage system at the forest edges, it is still very likely that patches of peat water are present deep inside the forest reserve. This type of habitat is likely to harbour peat swamp specialist species. Therefore, the species list provided here is likely to be far from comprehensive.

A total of 44 Odonata species covering eight families were collected from this inventory, representing 18% of the total number of species known from Peninsular Malaysia. Species found abundantly in AHFR were *Neurothemis fluctuans*, *Nannophya pygmaea*, *Ceragrion cerinorubellum*, *Pseudagrion williamsoni*, *Pseudagrion microcephalum*, *Brachydiplax chalybea*, *Rhyothemis obsolescens*, *Rhodothemis rufa*, *Ictinogomphus decoratus*, *Orthetrum sabina* and *Brachygonia oculata*. The true alluvial swamp and peat swamp species recorded at AHFR are *Amphicnemis gracilis*, *Archibasis viola*, *Brachygonia oculata*, *Elattoneura aurantiaca*, *Podolestes buwaldai*, *Podolestes orientalis*, *Pornothemis serrata*, *Rhyothemis aterrima* and *Risiophlebia dohrni*. Among these



swamp specialists, only *Archibasis viola*, *Brachygonia oculata*, *Elatoneura aurantiaca* and *Rhyothemis aterrima* were present in good number.

The Sungai Bebar area located at southern Pahang state remains the largest intact peat swamp forest in Peninsular Malaysia, with the area mainly flooded by low pH water. An Odonata survey of the Sungai Bebar peat swamp conducted in 2009 revealed many interesting species, including two new species and four new records for Peninsular Malaysia (Dow et al. 2010, 2012). In contrast, the peat swamp forest of AHFR is rather dry due to the massive drainage system bordering the forest reserve. Many swamp forest specialists recorded in Sungai Bebar have not been found in AHFR, such as *Elatoneura longispina*, *Ictinogomphus acutus*, *Amphicnemis bebar*, *Amphicnemis hoisen*, *Archibasis incisura*, *Archibasis melanocyana*, *Brachygonia ophelia*, *Nesoxenia lineata*, *Orthithemis pruinans* and *Rhyothemis pygmaea*. However, a photographic record of *Tyriobapta laidlawi* was made in November 2010 by Wetlands International staff from the head office (per. com. Marcel J. Silvius), and this was reported in Dow et al. (2012), so *T. laidlawi* can be included in the species list for AHFR (bring the total number of species recorded from the reserve to 45), which is the second site known for the species in Peninsular Malaysia.



Figure 6. *Indothemis carnatica*.

The most notable species collected from AHFR is *Indothemis carnatica* (Figure 6). A few individuals of *Indothemis carnatica* were collected at location H, at a shallow pool

along the open area of electricity pylons (Figure 5). *Indothemis carnatica* has previously been reported from India, Sri Lanka and Thailand, and it appears to be very scarce and local (Dow 2009). This is the first record of the species for Malaysia. Another interesting species recorded from AHFR is *Podolestes buwaldai*, a rare and local species confined to southern Peninsular Malaysia and Sumatra (Orr 2005). Only one specimen was collected during the short sampling trip to AHFR. This species was also photographed in November 2010 by Wetlands International staff from the head office (per. com. Marcel J. Silvius).

Further collecting is urgently needed in all of aquatic habitats occurring in AHFR, particularly in the inner part of the forest reserve. There are many more species that might yet be found in the peat swamp forest at AHFR than were collected during the short survey reported here. It is expected that the number of species found in AHFR will increase significantly with more sampling effort.

Although AHFR is now a state park, its aquatic habitats are still under threat because of the effects of the surrounding drainage system. If the specialist odonate fauna of AHFR is to survive in the long term, steps need to be taken to reduce the adverse impacts of the drainage system on the reserve.

Conclusion

With 44 species recorded during the short survey reported here, we can already say that AHFR has a rich Odonata fauna. It is significant that AHFR is a refuge for some of the scarce and local species (*Podolestes buwaldai* and *Tyrobapta laidlawi*) found in Peninsular Malaysia and is the only site known in Malaysia for *Indothemis carnatica*. The protection and conservation of AHFR is vital to safe guard these scarce Odonata species.

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