

A PRELIMINARY CHECKLIST OF FIREFLIES (COLEOPTERA: LAMPYRIDAE) WITH TWO NEW DISTRIBUTION RECORDS FROM SARAWAK

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ABSTRACT

The remarkable ability of fireflies for bioluminescence makes them one of the most charismatic species of beetles. Despite the increasing development and urbanisation especially in mangrove areas, the current status of fireflies in Sarawak is not well documented. Hence, this study aims to provide an updated preliminary checklist focusing on the firefly species from Sarawak, Malaysia to contribute to the scientific knowledge of Lampyridae. Twenty localities in Sarawak were selected as the sampling sites based on firefly sightings. Field surveys were carried out from October 2022 to February 2023 with additional samples obtained from the UNIMAS Insect Reference Collection (UIRC). The present study recorded a total of 372 individuals of fireflies representing five genera, namely *Pteroptyx* (with five species and two morphospecies), *Pyrocoelia* (with one species and one morphospecies), *Luciola* (with two species), *Colophotia* (with one species) and *Abscondita* (with one species). The first record of two species *Colophotia brevis* (Luciolinae) and *Pyrocoelia opaca* (Lampyrinae) in Sarawak was documented in this study. Thus, it is suggested that a more comprehensive study, especially in the central region of Sarawak alongside its preferred host trees should be conducted. This information will provide a better understanding of firefly habitats in Sarawak and assist to identify areas with significant conservation value.

Keywords: Fireflies, Lampyridae, bioluminescence, Coleoptera, Sarawak

ABSTRAK

Keupayaan luar biasa kelip-kelip untuk biopendarcahaya menjadikannya salah satu spesies kumbang yang sangat unik. Walaupun pembangunan dan pambandaran semakin meningkat terutamanya di kawasan bakau, dokumentasi status semasa kelip-kelip di Sarawak, Malaysia masih kurang. Oleh itu, kajian ini bertujuan untuk menyediakan senarai semak awal yang memfokuskan kepada spesies kelip-kelip dari Sarawak bagi menyumbang kepada pengetahuan saintifik Lampyridae. Dua puluh lokaliti di Sarawak telah dipilih sebagai tapak persampelan berdasarkan pencerapan kelip-kelip. Kerja lapangan telah dijalankan dari Oktober 2022 hingga Februari 2023 dengan sampel tambahan diperolehi daripada *UNIMAS Insect Reference Collection* (UIRC). Kajian ini telah merekodkan sebanyak 372 individu kelip-kelip daripada

lima genus, iaitu *Pteroptyx* (lima spesies dan dua morfospesies), *Pyrocoelia* (satu spesies dan satu morfospesies), *Luciola* (dua spesies), *Colophotia* (satu spesies) dan *Abcondita* (satu spesies). Dua spesies iaitu *Colophotia brevis* (Luciolinae) dan *Pyrocoelia opaca* (Lampyrinae) telah pertama kali direkodkan di Sarawak melalui kajian ini. Oleh itu, adalah dicadangkan bahawa kajian yang lebih komprehensif, terutamanya di wilayah tengah Sarawak bersama pokok perumah perlu dijalankan. Data ini bakal memberikan pemahaman yang lebih baik tentang habitat kelip-kelip di Sarawak dan mengenal pasti kawasan yang mempunyai nilai pemuliharaan yang signifikan.

Kata kunci: Kelip-kelip, Lampyridae, biopendarcahaya, Coleoptera, Sarawak

INTRODUCTION

Fireflies from the family Lampyridae are a very diversified taxon with over 2,000 species worldwide (Lewis et al. 2020). In Malaysia, Seri and Rahman (2022) have documented a total of 56 firefly species belonging to 16 genera, with 26 of these species located in East Malaysia. Fireflies can be found in temperate and tropical climates, concentrated in the mangrove, swamp and riparian habitats where congregating fireflies thrive (Wong 2022). Their preferred habitat is commonly situated near water sources, particularly in mangroves as the females will oviposit in sand or soil on the open ground adjacent to mangroves or the edge of forests (Hill & Abang 2010) and their larvae primarily feed on tiny river snails and insects (Hazmi & Sagaff 2017).

The behaviour of fireflies can be distinguished into two categories: congregating and solitary. Congregating fireflies display synchronised flashing displays and are commonly found in large groups, while solitary fireflies do not display synchronised flashes and are typically found alone or in small groups (Buck & Buck 1976; Mobilim & Dawood 2020). In Malaysia, the common local *Pteroptyx* spp. have been recorded in wetlands, estuaries and brackish water environments and are often seen congregating on a wide variety of riparian and mangrove trees, especially *Sonneratia caseolaris* (Jusoh et al. 2010; Wong & Yeap 2012). The two predominant species of fireflies in Malaysia are *Pteroptyx tener* Olivier and *Pteroptyx bearni* Olivier, as noted by Jusoh et al. (2018). In contrast, solitary fireflies are not known to congregate in large numbers and do not engage in synchronised flashing displays like their congregating counterparts. Although less documented and studied compared to congregating fireflies, recent studies have revealed that there are several genera of solitary fireflies in Malaysia, including *Abcondita*, *Colophotia*, *Luciola*, *Pygoluciola*, *Pyrocoelia*, and *Medeopteryx* (Jusoh et al. 2018; Mobilim & Dawood 2020; Seri & Rahman 2022).

A compilation of records from various works of literature reports the occurrence of at least 15 firefly species from four genera, namely *Abcondita*, *Colophotia*, *Luciola*, and *Pteroptyx*, in Sarawak (Abdullah et al. 2021; Ballantyne et al. 2015; Ballantyne et al. 2019; Jusoh et al. 2018; Seri & Rahman 2022; Wan Nurainie et al. 2020; Wong 2022). Among these, the most speciose genus in Sarawak is *Pteroptyx*, which comprises eight species. However, Wong (2022) cautious that the firefly occurrence of *P. tener* in Kuching, Sarawak was said to be “possibly extinct”. Jusoh and Hashim (2012) reported that the decline in congregations of *P. tener* in Malaysia is mainly due to the conversion of riverbank mangroves for agriculture, aquaculture, and urbanisation. Likewise, the study conducted by Hazmi and Sagaff (2017) and Faudzil et al. (2021) proved that the release of pollutants leads to the deterioration of river quality, causing a decline in firefly abundance. On a wider scale, this was supported by Lewis et al. (2020) who stated that habitat loss, artificial light, and pesticides are perceived as the three most serious threats to fireflies globally.