
Short Notes

Short Notes on Fireflies of Sungai Kawang, Sabah

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Abstract

A survey on the congregating fireflies located in the mangrove forest of Sungai Kawang, Kinarut, 20 kilometers south of Kota Kinabalu was conducted from September to October 2015. The dominant firefly species was *Pteroptyx bearni* Olivier. Out of 133 male *Pteroptyx* fireflies collected, 131 individuals belong to this species. The less common species *Pteroptyx malaccae* Gorham was collected on a mangrove tree that is away from the jetty. Most of the fireflies were collected from the dominant mangrove species, *Rhizophora mucronata*, while some were collected from *Aegiceras floridum* and *Lumnitzera littorea*. With a high population of congregating fireflies and the geographical advantages of Sungai Kawang, it has the potential to be developed as a tourist attraction. Proper development planning associated with a system for population monitoring and habitat conservation are essential for sustainable ecotourism.

Keywords: Congregating fireflies, *Pteroptyx bearni*, *Rhizophora mucronata*, population monitoring system, sustainable ecotourism, mangrove forest

Introduction

The intriguing beauty of wildlife has engrossed humans for centuries. The bioluminescence emitting ability of fireflies has fascinated people across geographical regions. A renowned writer, W. Somerset Maugham, described the congregating fireflies he saw during his trip heading up the river of Borneo back in 1922 as sparkling candles that lit up the mangrove trees that resemble an alluring Christmas tree (Maugham, 1977). It is really an uplifting experience to view the congregating fireflies at night, with the tiny flashing pixies gregariously lighting up mangrove trees on the riverine.

In Sabah, there are several places that are famous for firefly watching, for example, Sungai Klias (Chey, 2004) and Weston near the Beaufort District. Both are some 100 kilometers south of Kota Kinabalu. For tourists who spend most

Received 19 January 2016

Reviewed 28 March 2016

Accepted 18 May 2016

Published 15 October 2016

of their time in the capital of Sabah, it is inconvenient to travel far away from Kota Kinabalu for firefly watching. The high population of *Pteroptyx* fireflies and the geographical advantage of Sungai Kawang 20 kilometers south of Kota Kinabalu is an appropriate site to be developed for ecotourism.

Materials and Methods

A survey was conducted at nightfall in Sungai Kawang. The mangrove forest here is well concealed from artificial lighting; light pollution is suggested to deplete the *Pteroptyx* firefly population. Sampling was conducted on 21 September, 13 October and 27 October 2015. Fireflies on the display trees were collected using sweep-nets and placed in a plastic bag. The fireflies were later killed with ethyl acetate and preserved in vials with 70 % ethanol.

Results and Discussion

Two species of *Pteroptyx* fireflies were sampled throughout three sampling occasions. They were confirmed to be *Pteroptyx bearni* Olivier and *Pteroptyx malacca* Gorham (Ballantyne & Lambkin, 2013). There were a total of 217 individual fireflies collected with the ratio of 133 males to 84 females. The dominant firefly species in Sungai Kawang was *Pteroptyx bearni*; out of 133 males collected, 131 individuals belonged to this species. According to estimation, around 90 % of the mangrove species found on the riverine of Sungai Kawang belongs to the species *Rhizophora mucronata* (Rhizophoraceae), where most of the *Pteroptyx* fireflies congregated. By referring to the data collected, it is suggested that *Pteroptyx bearni* is not specific when it comes to display tree selection. Its predilection seems to be determined by tree availability and suitability rather than certain species of mangrove trees. Some fireflies can be found congregating on *Aegiceras floridum* (Primulaceae) and *Lumnitzera littorea* (Combretaceae). Several mangrove species coexist at the riverine, including *Avicennia alba* (Acanthaceae) and *Hibiscus tilliaceus* (Malvaceae). There was no visible *Nypa fruticans* (Arecaceae) along the riparian region, which is commonly found in a mangrove ecosystem. Table 1 summarizes the data collected from three sampling occasions.

Table 1. Firefly species sampled in the mangrove forest and their display tree species.

Date of sampling occasion	Firefly species	Display Tree species	Individual number of male fireflies	Individual number of female fireflies	Total
21 Sept 2015	<i>Pteroptyx bearni</i> & <i>Pteroptyx malaccae</i>	<i>Rhizophora mucronata</i> & <i>Aegiceras floridum</i>	15	19	34
13 Oct 2015	<i>Pteroptyx bearni</i>	<i>Rhizophora mucronata</i> & <i>Lumnitzera littorea</i>	36	19	55
27 Oct 2015	<i>Pteroptyx bearni</i> & <i>Pteroptyx malaccae</i>	<i>Rhizophora mucronat</i> , <i>Aegiceras floridum</i> & <i>Lumnitzera littorea</i>	82	46	128
		Total	133	84	217

Ecotourism potential and conservation of fireflies

World-renowned entomologist and writer, Edward O. Wilson, introduced and popularized the Biophilia hypothesis in his book in 1984. The Biophilia hypothesis suggests that there is an inborn connection between human beings and other forms of life. This natural behaviour of humans led to the rapid development of ecotourism. Sinha (2001) in his conference paper on wildlife tourism mentioned many conservationists and natural resource managers proposing that wildlife tourism can bring harm to the integrity of ecosystems, more specifically wildlife population dynamics and their behaviour. However, properly managed ecotourism should be able to benefit the ecosystem and local communities (Ondicho, 2012). Non-consumptive ecotourism should be emphasized in Sungai Kawang. As narrated by boatmen and local communities, tourists tend to collect some of the fireflies and place them into a container for viewing or to bring them out of their natural habitat. In addition, light pollution that acts as a significant disruptor in the firefly mating ritual (Mahadimenakbar et al., 2009), must be minimized in order to sustain a healthy population of fireflies (Chey, 2009). Sungai Kawang which is near Kota Kinabalu has the potential to be developed as an ecotourism site. However, proper development planning associated with population monitoring system and habitat conservation must be implemented in order to achieve sustainable utilization of natural resources.

Conclusion

The most common congregating firefly species found in Sungai Kawang is *Pteroptyx bearni* while *Pteroptyx malacca* can also be encountered. Sungai Kawang serves as a firefly watching option for tourists who do not want to travel for several hours from Kota Kinabalu to enjoy the elegant beauty of congregating fireflies. The habitats for congregating fireflies are rapidly degrading due to anthropogenic activities. This would eventually lead to the local extinction of the firefly population. Non-consumptive ecotourism is essential for the sustainability of the *Pteroptyx* firefly population in Sungai Kawang. Ecotourism development projects must be well planned in order to sustain the integrity of the ecosystem.

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