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Rofiza Yolanda

Biology Education Study
Programme, Faculty of Teacher
Training and Education,
University of Pasir Pengaraian,
Rokan Hulu District 28557, Riau
Province, Indonesia.

Arief Anthonius Purnama

Biology Education Study
Programme, Faculty of Teacher
Training and Education,
University of Pasir Pengaraian,
Rokan Hulu District 28557, Riau
Province, Indonesia.

The swallowtails butterflies (Lepidoptera: Papilionidae) from several area in Rokan Hulu District, Riau Province, Sumatra, Indonesia

Rofiza Yolanda, Arief Anthonius Purnama

Abstract

Papilionidae is a worldwide family, mostly tropical and containing many of largest and most beautiful insects, commonly known as swallowtails or birdwings butterflies. The objective of the present study was to explore the species of swallowtails butterflies in Rokan Hulu District, Riau Province, Sumatra, Indonesia. The sampling was done during November 2014 to January 2016 at nine areas of three Sub-district of Rokan Hulu District, Riau Province, Sumatra, Indonesia. We recorded 11 species of swallowtails butterflies belonging to 4 genera, namely *Graphium agamemnon*, *G. antipathes*, *G. delessertii*, *G. evemon*, *Pachliopta aristolochiae*, *Papilio demoleus*, *P. demolition*, *P. memnon*, *P. nephelus*, *P. polytes* and *Troides amphrysus*. The genus *Papilio* is the predominant in species number in this study.

Keywords: Butterflies, Papilionidae, Rokan Hulu

Introduction

Butterflies are a very large group of tremendous diversity and completely worldwide in distribution [1]. They belong to the order Lepidoptera and one of the most beautiful members in butterflies is the swallowtail butterflies [2]. Their size, bold colours and forceful presence, however, ensure they are among the best-known species. They are diverse in appearance and generally very easy to identify, even without capture. The family name comes from the genus *Papilio*. *Papilio* is Latin for butterfly and Carolus Linnaeus, whose 1758 classification using Latin binomial names is the basis of all modern biological nomenclature, placed every butterfly he knew in the genus *Papilio*. Later authors restricted the use of this name to certain swallowtails [3]. When compared with other insects, all swallowtails have large wings, ranging from the dainty, 50 mm wingspan of the dragontails of Indian and Malaysia (*Lamproptera* species), to the giant birdwings (*Trogonoptera*, *Troides*, *Ornithoptera*) of Indonesia and New Guinea [4] and *Parnassius* spp. is the smallest species, with merely 700 species and has a worldwide distribution [5].

The two sexes have similar markings with some subtle differences. The male may have fluffy scent scales in a fold on the hind wing and the females are usually larger and also have polymorphism. Most of them are non-migrant species. They play important role in the environment, as a pollinator because all of them are avid nectar-feeder. Some are economical very significant species, for example *Papilio demoleus* is a pest of lime, lemon, orange and other cultivated *Citrus* plants. It can occasionally turn into serious pest, causing considerable damage to the plants. Others, for example, papilionidae butterflies are valuable in trade as high-priced fancy items [1, 5-7] and 78 species of this family has put into threatened species category based on IUCN [4]. Almost all of them are distributed as cosmopolitan, such as in urban area, mangrove and peat swamp, lowland open country area, lowland and highland forest [2, 8].

Although the swallowtails butterflies are of huge importance to the ecosystem and human, not much is known about the swallowtails butterflies of Rokan Hulu District, Riau Province, Sumatra, Indonesia. Most area in Rokan Hulu District has changed into the palm oil plantation. The rapid landscape change is one of the key factor leading to biodiversity loss in Rokan Hulu District and one of them is the swallowtails butterflies. Only one researcher has reported 10 species of the swallowtails butterflies from the tourism Hapanasan, Rokan Hulu District [9]. In this study, we try to give a new information about the swallowtails butterflies species from different area in Rokan Hulu District, outside of the area from previous author [9].

Correspondence

Rofiza Yolanda

Biology Education Study
Programme, Faculty of Teacher
Training and Education,
University of Pasir Pengaraian,
Rokan Hulu District 28557, Riau
Province, Indonesia.

The aim of this study was to determine the species diversity of swallowtails butterflies from several location in Rokan Hulu District and to update the data of papilionidae butterflies fauna in Rokan Hulu District, Riau Province, Sumatra, Indonesia.

2. Materials and Methods

Study Area

The study was conducted from November 2014 to January 2016 by using random sampling technique in 9 areas of 3 Sub-district, Rokan Hulu District, Riau Province, Sumatra, Indonesia (Table 1, Figure 1).

Table 1: Sampling locations of the swallowtail butterflies in Rokan Hulu District, Riau Province, Sumatra, Indonesia.

Sub-District	Area	Coordinates
Rambah	Batang Samo	0°50'79.00"N and 100°20'43.00"E
	Wonosari Timur	0°51'47.00"N and 100°18'71.00"E
	Kampung Baru	0°52'20.81"N and 100°19'11.37"E
	Islamic Centre	0°53'40.96"N and 100°18'30.98"E
	Pasir Putih	0°52'53.22"N and 100°17'45.27"E
Bangun Purba	Aek Matua	0°50'93.00"N and 100°10'86.00"E
Rambah Hilir	Nogori Kumu	0°55'38.19"N and 100°20'22.83"E
	University of Pasir Pengaraian	0°55'47.86"N and 100°19'39.09"E
	Kumu Baru	0°57'17.92"N and 100°19'48.63"E

Collection and Preservation

Butterflies were collected randomly by using sweep net. Once the butterflies in the net, they were caught by hand naked and their thorax were pinched in order to immobilized the butterflies movement than stored in butter-paper envelopes [5]. Each envelope was labeled with site, date and important information. The samples were then transported to the Laboratory of Biology, University of Pasir Pengaraian, Rokan Hulu District, Indonesia to preserve dried specimen on the spreading boards.

Specimen Identification

The specimens were identified with several literatures from journals and butterflies identification books [2, 3, 5, 10-13, 3, 14- 20].

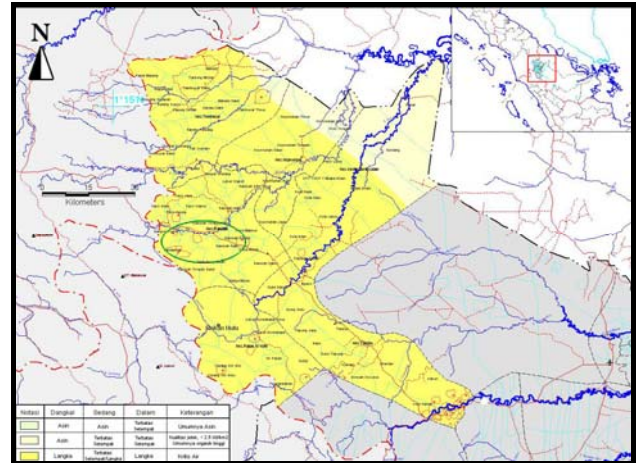


Fig 1: The map of study area (Green Circle) in Rokan Hulu District, Riau Province, Sumatra, Indonesia.

3. Results and Discussion

Eleven species of swallowtails butterflies belonging to four genera and 69 individuals were found in this study. The genus *Papilio* has highest species richness (5 species), followed by *Graphium* (4 species), *Pachliopta* (1 species) and *Troides* (1 species). The highest number of individuals found in this study was *Papilio demoleus* (19 individuals), followed by *Papilio memnon* (15 individuals), *Papilio polytes* (9 individuals), *Troides amphrysus* (8 individuals), *Pachliopta aristolochiae* (6 individuals), *Papilio nephelus* (3 individuals), *Graphium agamemnon*, *G. delessertii*, *G. evemon* and *Papilio demolion* (2 individuals each species) and *Graphium antipathes* (1 individual) (see Table 2 and Figure 2-7).

Based on this study, the species of swallowtails butterflies in area is higher than Urban Forest of Muhammad Sabki, Jambi Province, Indonesia (5 species) [21], Tanjung Balai Karimun Karimun District, Kepulauan Riau, Sumatra, Indonesia (6 species) [22], and the tourism area Hapanasan, Rokan Hulu District, Riau Province, Sumatra, Indonesia (10 species) [9], but lower than West Sumatra (27 species) [23], 9 National Park of Sumatra (31 species) [24] and Sago mountain, West Sumatra, Indonesia (20 species) [25].

Table 2: Checklist of swallowtails butterflies species from sampling area of Rokan Hulu District, Riau Province, Sumatra, Indonesia (1: Batang Samo, 2: Wonosari Timur, 3: Kampung Baru, 4: Islamic Centre, 5: Pasir Putih, 6: Aek Matua, 7: Nogori Kumu, 8: University of Pasir Pengaraian, 9: Kumu Baru).

Species	Area									N
	1	2	3	4	5	6	7	8	9	
<i>Graphium agamemnon</i> (Linnaeus, 1758)	-	-	-	-	-	1	-	-	1	2
<i>Graphium antipathes</i> (Cramer, [1775])	-	-	-	-	-	1	-	-	-	1
<i>Graphium delessertii</i> (Guerin-Meneville, 1839)	-	-	-	-	-	2	-	-	-	2
<i>Graphium evemon</i> (Boisduval, 1836)	-	-	-	-	-	2	-	-	-	2
<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	-	-	1	-	-	5	-	-	-	6
<i>Papilio memnon</i> Linnaeus, 1758	-	-	1	-	2	-	3	2	7	15
<i>Papilio demolion</i> Cramer, [1776]	-	-	-	-	-	-	-	2	-	2
<i>Papilio demoleus</i> Linnaeus, 1758	-	3	-	-	2	1	5	1	7	19
<i>Papilio nephelus</i> Boisduval, 1836	-	-	1	-	-	-	1	1	-	3
<i>Papilio polytes</i> Linnaeus, 1758	-	-	1	1	-	2	1	1	3	9
<i>Troides amphrysus</i> (Cramer, [1779])	3	-	-	-	-	-	-	1	4	8
Total individuals	3	3	4	1	4	14	10	8	22	69

In this study we found three different species from the previous author which study in Rokan Hulu District too but in different area, they were *Atrophaneura antipus*, *Graphium sarpedon* and *Troides helena*. This difference caused by the area that will provide different habitat and host plants for the swallowtails butterflies. According to DeVries [26] the hostplant relationships play important role in butterfly biology, one of them the Papilionidae butterfly. Overall, we can calculate 14 species of swallowtails butterflies has been recorded from Rokan Hulu District, Riau Province, Sumatra, Indonesia.

4. Conclusion

During the study, 11 species belonging to 4 genera of swallowtails butterflies were recorded from several area of Rokan Hulu District, Riau Province, Sumatra, Indonesia, namely *Graphium agamemnon*, *G. antipathes*, *G. delessertii*, *G. evemon*, *Pachliopta aristolochiae*, *Papilio demoleus*, *P. demolion*, *P. memnon*, *P. nephelus*, *P. polytes* and *Troides amphrysus*.



Fig 2: 1. *Graphium agamemnon* ♂, 2. *Graphium antipathes* ♂, 3. *Graphium delessertii* ♂. a. dorsal view, b. ventral view. Scale bar = 20 mm.

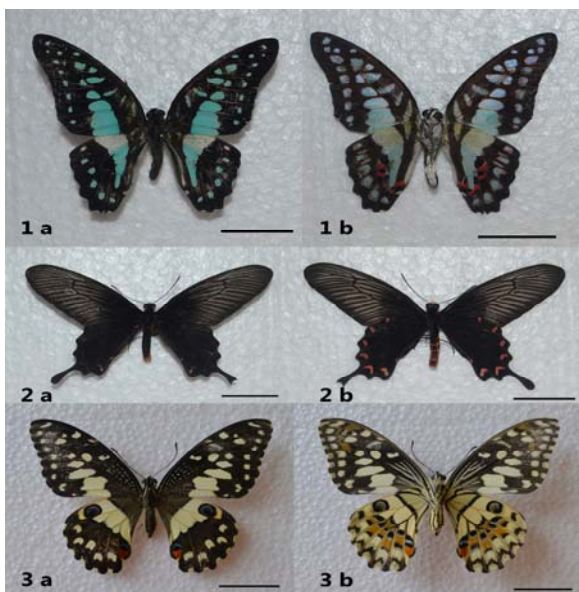


Fig 3: 1. *Graphium evemon* ♂, 2. *Pachliopta aristolochiae* ♂, 3. *Papilio demoleus* ♂. a. dorsal view, b. ventral view. Scale bar = 20 mm.

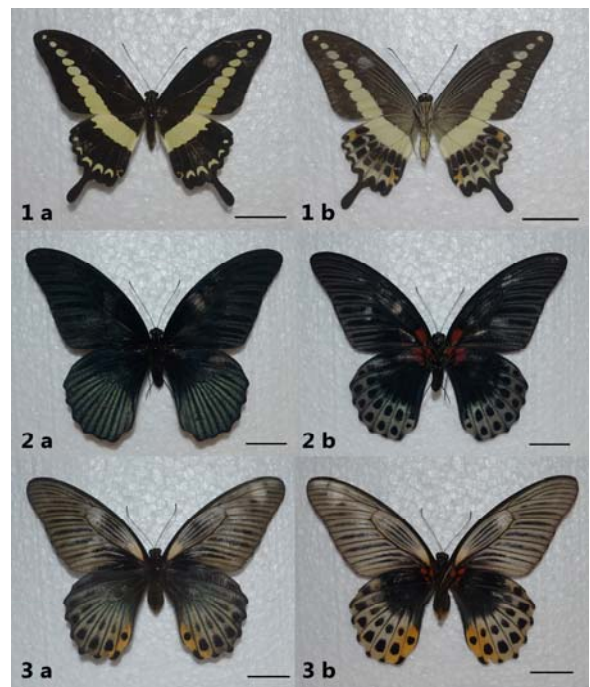


Fig 4: 1. *Papilio demolion* ♂, 2. *Papilio memnon* ♂, 3. *Papilio memnon* ♀. a. dorsal view, b. ventral view. Scale bar = 20 mm.

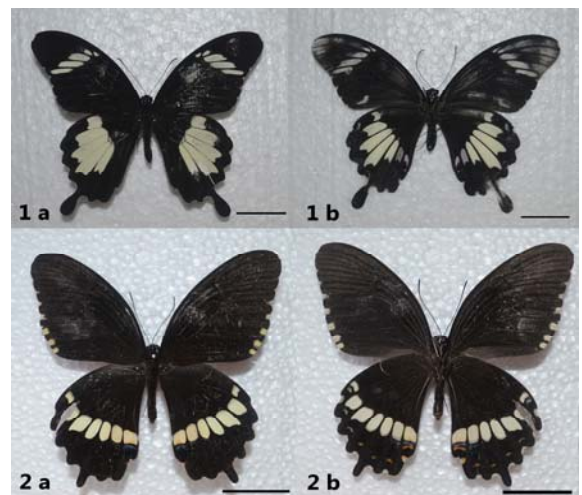


Fig 5: 1. *Papilio nephelus* ♂, 2. *Papilio polytes* ♂. a. dorsal view, b. ventral view. Scale bar = 20 mm.



Fig 6: *Troides amphrysus* ♂. a. dorsal view, b. ventral view. Scale bar = 20 mm.



Fig 7: *Troides amphrysus* ♀. a. dorsal view, b. ventral view. Scale bar = 20 mm.

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