

**AN UPDATED CHECKLIST OF BUTTERFLIES
(LEPIDOPTERA: RHOPALOCERA) FROM THE FRASER'S HILL,
PAHANG, MALAYSIA**

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ABSTRACT

A total of 32 species of butterflies from five families, i.e. Nymphalidae, Papilionidae, Pieridae, Lycaenidae and Hesperiiidae have been recorded in this study from the Fraser's Hill, Pahang, Malaysia. There were 21 new added records compared to previous studies that have been done by some researchers. The current checklist of butterflies in Fraser's Hill is 83 species. The species checklist includes three protected species that were listed under the Wildlife Conservation Act 2010, namely *Troides brookiana albescens* Rothschild, *Troides helena cerberus* (C. & R. Felder) and *Charaxes bernadus crepax* Fruhstorfer.

Keywords: Lepidoptera, butterfly, Fraser's Hill, protected species

ABSTRAK

Sebanyak 32 spesies kupu-kupu yang terdiri daripada lima famili, iaitu Nymphalidae, Papilionidae, Pieridae, Lycaenidae dan Hesperiiidae telah direkodkan dalam kajian ini dari Bukit Fraser, Pahang, Malaysia. Terdapat 21 spesies tambahan telah direkodkan berbanding dengan kajian sebelumnya yang dilakukan oleh beberapa orang penyelidik. Jumlah senarai semak terkini kupu-kupu di Bukit Fraser adalah sebanyak 83 spesies. Senarai semak spesies merangkumi tiga spesies yang dilindungi di bawah Akta Pemuliharaan Hidupan Liar 2010, iaitu *Troides brookiana albescens* Rothschild, *Troides helena cerberus* (C. & R. Felder) dan *Charaxes bernadus crepax* Fruhstorfer.

Kata kunci: Lepidoptera, kupu-kupu, Bukit Fraser, spesies dilindungi

INTRODUCTION

This paper presents a checklist of butterfly species that have been recorded from the Fraser's Hill, Pahang, a highland resort area in the District of Raub, Pahang, between latitude 3° 46' 25'' to 3° 47' 50'' and longitude 110° 43' 50'' to 101° 45' 15'' East of the Titiwangsa Main Range. Located at elevation of between 1000 – 1525 meters above sea level, this area is an ideal retreat to escape from the hustle and bustle of city life. It is also an ecotourism site noted for its highly diverse flora and fauna and unique highland forest reserves (Latiff et al. 2009).

Studies of the Malayan butterflies include some 1031 species recorded by Corbet et al. (1992) covering a total of five families, i.e. Nymphalidae, Papilionidae, Pieridae, Lycaenidae and Hesperidae. There are 1038 species of butterflies recorded in Peninsular Malaysia (Eliot & Kirton 2000) and 944 species in Borneo (Otsuka 2001). Latest, Wilson et al. (2015) found that 1182 species of butterflies are found in Semananjung Malaysia.

According to Nurul Amira et al. (2017), there were 11 species of butterflies at the ridge of Gunung Brinchang, Cameron Highlands while 59 species discovered by Norela et al. (2011) at Gunung Jasar and Air Terjun Parit, Cameron Highlands. A total 214 species recorded by Karen Chia Huey Min (2014) at different elevations in Genting Highlands. A study from Aqilah Awang et al. (2018) was collected 396 species of butterflies so far in Johor and the data based on field sampling and published records. In Fraser's Hill, a total of 62 species of butterflies have been found by Nurul Atika Salim (2017), Norela et al. (2010) and Zaidi et al. (2001). Hence, this study has been carried out to extend the documentation of the butterfly species of the Fraser's Hill for future research works, and in support of the management and conservation of this rich and pristine tropical habitat.

MATERIALS AND METHOD

The study period was from 21st March 2018, 9th – 10th February 2018, 18th – 19th December 2017 and on 4th and 5th August 2017 and the sampling efforts were concentrated around the UKM-Fraser's Hill Research Centre, at the Jeriau Waterfall, along the Bishop Trail, Allan's Water, Fraser's Hill Town, as well as in the vicinity of the Pine Resort. Specimens of butterfly species were collected manually using the aerial nets with diameter 30-40 cm. The fieldwork was specifically focused on butterflies that were actively flying during daytime from 8.00 am to 5.00 pm. The butterflies were also lured into hanging traps baited with over-ripe fruits such as pineapple (*Ananas comosus*), papaya (*Carica papaya*) and carambola (*Averrhoa carambola*). The traps were randomly placed in the study area at 1-2 metres height above ground. Each of the captured specimen was killed by gently pressing its thorax between the forefinger and thumb, then the specimen was placed flat within a triangular folded paper envelope. The specimens were brought back to the laboratory where each specimen collected was softened, pinned, labeled, wing-stretched and oven-dried at 45^oC to 50^oC for five days before being identified up to the species level. The taxonomic identification of the butterfly species followed Corbet et al. (1992).

RESULTS

In this study, 32 species were recorded from five families with 11 subfamilies and 21 from that amount were new records for Fraser's Hill (Table 1). Focusing on the new records, 10 species were from Family Nymphalidae: *Lexias pardalis dirteana* (Corbet) (Figure 2.4), *Cupha erymanthis lotis* (Sulzer) (Figure 2.5), *Moduza procris milonia* (Fruhstorfer) (Figure 2.6), *Rhinopalpa polynice eudoxia* (Guérin-Méneville) (Figure 2.7), *Cethosia penthesilea methypsea* Butler (Figure 2.8), *Cyrestis nivea nivalis* (C. & R. Felder) (Figure 2.9), *Idea stollis logani* (Moore), *Taenaris horsfieldii birchi* Distant, *Tanaecia iapis puseda* (Moore) and also *Faunis canens arcesilas* Stichel (Figure 2.10). Five species recorded from family Hesperidae: *Pithauria marsena* (Staudinger) (Figure 2.11), *Polytremis eltota corbeti* Evans, *Koruthaialos sindu sindu* (C. & R. Felder), *Potanthus omaha omaha* (W. H. Edwards) and *Halpe arcuate* Evans. There are only two species each from Family Papilionidae which are *Papilio iswara iswara* White and *Pathysa delessertii delessertii* (Guérin-Méneville) (Figure

2.12), Family Lycaenidae: *Allotinus leogoron leogoron* Fruhstorfer and *Jamides celeno aelianus* (Fabricius) and family Pieridae which are *Eurema blanda snelleni* (Moore) and *Leptosia nina nina* Fruhstorfer.

Table 1 The species of butterfly recorded in this study at Fraser's Hill.

No.	Species of Butterfly
Family Papilionidae	
Subfamily Papilioninae	
1.	<i>Troides brookiana albescens</i> Rothschild
2.	<i>Pathysa delessertii delessertii</i> (Guérin-Méneville)*
3.	<i>Papilio iswara iswara</i> White*
Family Pieridae	
Subfamily Coliadinae	
4.	<i>Eurema hecabe contubernalis</i> (Moore)
5.	<i>Eurema blanda snelleni</i> (Moore)*
Subfamily Pierinae	
6.	<i>Leptosia nina nina</i> Fruhstorfer*
Family Nymphalidae	
Subfamily Danainae	
7.	<i>Euploea radamanthus radamanthus</i> (Fabricius)
8.	<i>Ideopsis vulgaris macrina</i> (Fruhstorfer)
9.	<i>Ideopsis gaura perakana</i> Fruhstorfer
10.	<i>Idea stollii logani</i> (Moore)*
11.	<i>Parantica aspasia aspasia</i> (Fabricius)
Subfamily Pierinae	
12.	<i>Appias lyncida vasava</i> (Fruhstorfer)
13.	<i>Delias descombesi eranthos</i> Fruhstorfer
14.	<i>Prioneris thestylis malaccana</i> (Fruhstorfer)
Subfamily Satyrinae	
15a.	<i>Ypthima pandocus corticaria</i> (Butler)
15b.	<i>Ypthima pandocus tahanensis</i> (Pendlebury)
Subfamily Nymphalinae	
16.	<i>Cyrestis nivea nivalis</i> (C. & R. Felder)*
17.	<i>Cupha erymanthis lotis</i> (Sulzer)*
18.	<i>Rhinopalpa polynice eudoxia</i> (Guérin-Méneville)*
19.	<i>Moduza procris milonia</i> (Fruhstrofer)*
20.	<i>Cethosia penthesilea methypsea</i> Butler*
21.	<i>Lexias pardalis dirteana</i> (Corbet)*
22.	<i>Tanaecia iapis puseda</i> (Moore)*
Subfamily Morphinae	
23.	<i>Taenaris horsfieldii birchi</i> Distant*
24.	<i>Faunis canens arcesilas</i> Stichel*
Family Lycaenidae	
Subfamily Miletinae	
25.	<i>Allotinus leogoron leogoron</i> Fruhstorfer*
Subfamily Lycaeninae	

26.	<i>Jamides celeno aelianus</i> (Fabricius)*
27.	<i>Pithecopus corvus corvus</i> Fruhstorfer
Family Hesperiiidae	
Subfamily Hesperiiinae	
28.	<i>Potanthus omaha omaha</i> (W. H. Edwards)*
29.	<i>Notocrypta clavata clavata</i> (Staudinger)
30.	<i>Pithauria marsena</i> (Staudinger)*
31.	<i>Polytremis eltota corbeti</i> Evans*
32.	<i>Halpe arcuate</i> Evans*
33.	<i>Koruthaialos sindu sindu</i> (C. & R. Felder)*

*new records of butterfly in Fraser's Hill

Nurul Atika Salim (2017) recently added another five newly recorded species compared to Norela et al. (2010) and Zaidi et al. (2001). This study covered the area of Jeriau Waterfall and in the vicinity of the UKM-Fraser's Hill Research Centre. Four species under the family Lycaenidae were *Celastrina lavenduralis isabella* (Corbet), *Udara coalita briga* (Toxopeus), *Udara cyma cyma* (Toxopeus) and *Udara dilecta dilecta* (Moore), while another species, *Melanitis ieda ieda* (Linnaeus), was from the family Nymphalidae.

Previous records by Norela et al. (2010) listed out some 47 species of butterflies from five families, i.e. Nymphalidae, Papilionidae, Pieridae, Lycaenidae and Hesperiiidae collected during four days of sampling in the study area. One protected species under the Wildlife Conservation Act 2010, *Troides brookiana albescens* Rothschild was also recorded in this study.

Zaidi et al. (2001) recorded 26 species of butterflies in their study including 10 additional species compared to Norela et al. (2010), namely: *Troides helena cerberus* (C. & Felder), *Pachliopta coon doubledayi* (Wallace), *Papilio memnon agenor* Linnaeus, *Appias cardena perakana* (Fruhstorfer), *Pareronia valaria lutescens* (Butler), *Ideopsis gaura perakana* Fruhstorfer, *Euploea eyndhovii gardiner* Fruhstorfer, *Chersonesia peraka peraka* Distant, *Udara selma tanarata* (Corbet) and *Chilades lajus tovoyanus* Evans.

Overall, a total of 83 butterfly species from five families have been recorded for the Fraser's Hill area. The dominant family in the checklist is Nymphalidae (with 32 species), followed by Lycaenidae (18 species), Pieridae (15 species), Papilionidae (11 species) and lastly, Hesperiiidae, being the least dominant family with seven species only. All of the species recorded are listed as Appendix 1. Three species were listed under the Wildlife Conservation Act 2010, namely *Troides brookiana albescens* Rothschild, *Troides helena cerberus* (C. & R. Felder) and *Charaxes bernadus crepax* Fruhstorfer (Appendix 2 – Figure 2.1, 2.2 & 2.3).

DISCUSSION

The location of samplings was varied for all of these studies. Nurul Atika Salim (2017) only focused at Jeriau Waterfall and UKM-Fraser's Hill Research Centre. The sampling areas of Norela et al. (2010) were at Bishop Trail, Pine Resort, Jeriau Waterfall and UKM-Fraser's Hill Research Centre while Zaidi et al. (2001) only covered at the resort's area and also Jeriau Waterfall. This recent study has been done at Jeriau Waterfall, UKM-Fraser's Hill Research Centre, along the Bishop Trail, Pine Resort, Allan's Water and the sampling area have been

broadening to the Fraser's Hill Town. As a result, 22 species of butterflies were added as new records in this study because the range of sampling area were wider than the previous studies. The availability of light and abundance of host and food plants may be effect the present of butterflies (Beccaloni 1997).

Some species listed by previous study were not collected during this study because we focusing on the certain species to contribute to the new record. Sampling times were also effect the results. The study shown by Corbet et al. (1992), butterflies generally are more abundant from April to September than during the rest of the year. Certain species favour the period from December to May. Braby (1995) mentioned that climatic factors such as drought and heavy rain might affect the butterfly species abundance. Many insect species attained their maximum adult abundance during the wet season in the tropical region (Didham & Springate 2003; Tiple & Khurad 2009).

A study conducted by Suhairiza et al. (2017) have found 138 species of butterflies at different altitudes along the Raub Corridor to Fraser's Hill. This record was highest compared to other studies because it has been done at three different altitudes so, more data can be collected. Only 67 species of butterfly have been collected at altitude of 1000 - 1250m compared to 82 species at the lowest altitude around 400m - 500m. Van Lien & Yuan (2003) indicated that the diversity of butterflies and other insects decreased with increasing in latitudes and altitudes. However, the data from their study cannot be extracted and used in this an updated checklist as they did not emphasize which species collected at the altitude of 1000 - 1250m.

CONCLUSION

To date, a total of 83 species of butterflies have been recorded from several studies done over the years in the Fraser's Hill area. The record can be further enriched by more comprehensive surveys involving more man-hours and a longer duration of sampling days to update the butterfly checklist of Fraser's Hill specifically, and for Peninsular Malaysia generally. It is also hoped that this study may contribute towards the wildlife conservation efforts in this country. The tourists can find some of the protected species of butterflies in Fraser's Hill and it will promote ecotourism as well as helping local's socioeconomic.

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APPENDICES

Appendix 1 The species of butterfly recorded in recent and previous study in Fraser's Hill

No.	Species of Butterfly
Family Papilionidae	
Subfamily Papilioninae	
1.	<i>Troides brookiana albescens</i> Rothschild *
2.	<i>Troides helena cerberus</i> (C. & R. Felder) *
3.	<i>Pathysa antiphates itamputi</i> (Butler)
4.	<i>Pathysa delessertii delessertii</i> (Guérin-Méneville)
5.	<i>Graphium sarpedon luctatius</i> (Fruhstorfer)
6.	<i>Graphium agamemnon agamemnon</i> (Linnaeus)
7.	<i>Graphium doson evemonides</i> (Honrath)
8.	<i>Papilio helenus helenus</i> (Linnaeus)
9.	<i>Papilio memnon agenor</i> Linnaeus
10.	<i>Papilio iswara iswara</i> White
11.	<i>Pachliopta coon doubledayi</i> (Wallace)
Family Pieridae	
Subfamily Coliadinae	
12.	<i>Eurema ada iona</i> (Talbot)
13.	<i>Eurema sari sodalis</i> (Moore)
14.	<i>Eurema andersonii andersonii</i> (Moore)
15.	<i>Eurema hecabe contubernalis</i> (Moore)
16.	<i>Eurema simulatrix tecmessa</i> (de Niceville)
17.	<i>Eurema lacteola lacteola</i> (Distant)
18.	<i>Eurema blanda snelleni</i> (Moore)
Subfamily Pierinae	
19.	<i>Phrissura aegis cynis</i> (Hewitson)
20.	<i>Prioneris thestylis malaccana</i> (Fruhstorfer)
21.	<i>Appias lyncida vasava</i> (Fruhstorfer)
22.	<i>Appias cardena perakana</i> (Fruhstorfer)
23.	<i>Delias descombesi eranthos</i> Fruhstorfer
24.	<i>Salatera liberia distanti</i> (Butler)
25.	<i>Pareronia valaria lutescens</i> (Butler)
26.	<i>Leptosia nina nina</i> Fruhstorfer
Family Nymphalidae	
Subfamily Danainae	
27.	<i>Ideopsis vulgaris macrina</i> (Fruhstorfer)
28.	<i>Ideopsis gaura perakana</i> Fruhstorfer
29.	<i>Idea stolli logani</i> (Moore)*
30.	<i>Danaus melanippus hegesippus</i> (Cramer)
31.	<i>Parantica aspasia aspasia</i> (Fabricius)
32.	<i>Euploea radamanthus radamanthus</i> (Fabricius)
33.	<i>Euploea mulciber mulciber</i> (Cramer)
34.	<i>Euploea camaralzeman paraclaudina</i> (Pendlebury)
35.	<i>Euploea sylvester harrisii</i> C. & R. Felder
36.	<i>Euploea eyndhovii gardineri</i> Fruhstorfer

Subfamily Satyrinae

- 37a. *Ypthima pandocus corticaria* (Butler)
- 37b. *Ypthima pandocus tahanensis* (Pendlebury)
- 38. *Melanitis phedima abdullae* Distant
- 39. *Melanitis ieda ieda* (Linnaeus)
- 40. *Neorina lowii neophyte* (Fruhstorfer)
- 41. *Mycalesis anaxias senoi* Aoki & Uemura

Subfamily Nymphalinae

- 42. *Vindula dejone erotella* (Butler)
- 43. *Neptis hylas papaja* Moore
- 44. *Cyrestis maenalis martini* Hartert
- 45. *Cyrestis nivea nivalis* (C. & R. Felder)
- 46. *Junonia orithya wallacei* Distant
- 47. *Chersonesia peraka peraka* Distant
- 48. *Cupha erymanthis lotis* (Sulzer)
- 49. *Rhinopalpa polynice eudoxia* (Guérin-Méneville)
- 50. *Moduza procris milonia* (Fruhstorfer)
- 51. *Cethosia penthesilea methypsea* Butler
- 52. *Lexias pardalis dirteana* (Corbet)
- 53. *Tanaecia iapis puseda* (Moore)

Subfamily Morphinae

- 54. *Amathusia phidippus phidippus f. chersias* Fruhstorfer
- 55. *Taenaris horsfieldii birchi* Distant
- 56. *Faunis canens arcesilas* Stichel

Subfamily Charaxinae

- 57. *Polyura athamas athamas* (Drury)
- 58. *Charaxes bernardus crepax* Fruhstorfer *

Family Lycaenidae**Subfamily Riodininae**

- 59. *Zemeros flegyas albipunctatus* Butler

Subfamily Miletinae

- 60. *Allotinus apries apries* Fruhstorfer
- 61. *Allotinus leogoron leogoron* Fruhstorfer

Subfamily Lycaeninae

- 62. *Zizula hylax pygmaea* (Snellen)
 - 63. *Zizina otis lampa* (Corbet)
 - 64. *Zizeeria karsandra* (Moore)
 - 65. *Jamides pura pura* (Moore)
 - 66. *Jamides ferrari evansi* Riley & Corbet
 - 67. *Jamides celeno aelianus* (Fabricius)
 - 68. *Heliophorus epicles tweediei* Eliot
 - 69. *Lampides boeticus* (Linnaeus)
 - 70. *Pithecops corvus corvus* Fruhstorfer
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71. *Udara selma tanarata* (Corbet)
 72. *Chilades lajus tovoyanus* Evans
 73. *Celastrina lavenduralis isabella* (Corbet)
 74. *Udara coalita briga* (Toxopeus)
 75. *Udara cyma cyma* (Toxopeus)
 76. *Udara dilecta dilecta* (Moore)

Family Hesperidae

Subfamily Hesperinae

77. *Potanthus ganda ganda* (Fruhstorfer)
 78. *Potanthus omaha omaha* (W. H. Edwards)
 79. *Notocrypta clavata clavata* (Staudinger)
 80. *Pithauria marsena* (Staudinger)
 81. *Polytremis eltota corbeti* Evans
 82. *Halpe arcuate* Evans
 83. *Koruthaialos sindu sindu* (C. & R. Felder)
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*protected species under the Wildlife Conservation Act 2010

Appendix 2 Photograph some of butterflies recorded.



Figure 2.1 *Troides brookiana albescens* Rothschild (Family: Papilionidae, Subfamily: Papilioninae)



Figure 2.2 *Troides helena cerberus* (C. & R. Felder) (Family: Papilionidae, Subfamily: Papilioninae)



Figure 2.3 *Charaxes bernardus crepax* Fruhstorfer (Family: Nymphalidae, Subfamily: Charaxinae)



Figure 2.4 *Lexias pardalis dirteana* (Corbet) (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.5 *Cupha erymanthis lotis* (Sulzer) (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.6 *Moduza procris milonia* (Fruhstorfer) (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.7 *Rhinopalpa polynice eudoxia* (Guérin-Méneville) (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.8 *Cethosia penthesilea methypsea* Butler (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.9 *Cyrestis nivea nivalis* (C. & R. Felder) (Family: Nymphalidae, Subfamily: Nymphalinae)



Figure 2.10 *Faunis canens arcesilas* Stichel (Family: Nymphalidae, Subfamily: Morphinae)



Figure 2.12 *Pithauria marsena* (Staudinger) (Family: Hesperidae, Subfamily: Hesperinae)



Figure 2.11 *Pathysa delessertii delessertii* (Guérin-Méneville) (Family: Papilionidae, Subfamily: Papilioninae)