

**THE BUTTERFLY SPECIES
(INSECTA: LEPIDOPTERA: RHOPALOCERA)
OF KINABALU PARK, SABAH**

Christoph L. Häuser, Christian H. Schulze and Konrad Fiedler

ABSTRACT. - Compiled records of 625 butterfly species from the area of Kinabalu Park in Sabah, Malaysia, on northwestern Borneo are presented in a systematic arrangement. The list is based on published records, unpublished specimen data, and field observations by the authors between 1993 and 1996. For each species, all recording locations within the park are listed including some localities adjacent to the present park boundaries. The results are interpreted through comparison with the entire butterfly fauna of the island, and with data from two other areas within northern Borneo (Brunei: Kuala Belalong; Sarawak: Gunung Mulu). The species recorded at Kinabalu Park together represent 66.7% of the Bornean butterfly fauna, with Pieridae reaching 90.5% and Lycaenidae 53.2%. For all groups, the species numbers found in Kinabalu Park are considerably higher than those from any of the other Bornean locations, which is probably partly due to sampling effort. The importance of Mt. Kinabalu as a regional diversity hotspot for butterflies is stressed, and the need for more detailed studies with regard to conservation efforts is emphasized.

KEY WORDS. - Biodiversity, butterflies, check-list, sampling effort, species inventory

INTRODUCTION

Mount Kinabalu on Borneo, with Low's peak reaching 4,101 meters (13,455 feet), is the highest mountain in southeast Asia (between the Himalayas and New Guinea), and is widely known for its outstandingly diverse flora and fauna (Whitehead, 1893; Luping et al., 1978; Frahm et al., 1990; Wong & Phillipps, 1996). For a long time the mountain has attracted individual collectors, as well as scientific expeditions and research projects directed towards the study of insects, in particular butterflies (Moulton, 1913; Enriquez, 1927; Pendlebury & Chasen, 1932; Barlow et al., 1971; Zaidi & Kayau, 1995). The butterfly fauna of Mt. Kinabalu can therefore be regarded as comparatively well surveyed, and the area certainly represents one of the most visited localities by entomologists on the island of Borneo. A first butterfly list based on observations during an expedition to Mt. Kinabalu in 1965 has already been

C. L. Häuser - Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart, Germany. **C. H. Schulze, K. Fiedler** - Department of Animal Ecology I, University of Bayreuth, D-95440 Bayreuth, Germany.

published (Holloway & Robinson, 1978), and other recent publications deal with the butterflies of different parts of northern Borneo (Holloway, 1978; Cassidy, 1982; Holloway, 1984; Cassidy, 1985; Orr & Häuser, 1996), and the fauna of the entire island (Otsuka, 1988; Seki et al., 1991; Maruyama & Otsuka, 1991). However, no up-to-date list is available for the butterfly species of Kinabalu Park (Taman Kinabalu), which today represents one of the largest remaining protected areas of montane forest in northern Borneo.

The present paper intends to provide a first comprehensive check-list of all butterfly species that occur within the boundaries of Kinabalu Park, a state protected area established around the mountain more than twenty years ago. This list, which still must be regarded as tentative, is meant to both form a basis for and stimulate more detailed surveys and further research on the local butterfly community. It should facilitate comparisons of the butterfly fauna of Mt. Kinabalu with other areas of Borneo and further parts of Southeast Asia for regional biodiversity assessments, and it will hopefully enable to better characterize the peculiarities of the butterfly community of Mt. Kinabalu. Finally, we hope that the present list will be of use for local authorities concerned with the planning and implementation of conservation measures.

STUDY AREA

Mt. Kinabalu is located at 6°05'N and 160°33'E in northeastern Borneo, in the state of Sabah which forms part of the federation of Malaysia (see Wong & Phillipps, 1996, for details on ethnology, geology and natural history; for vegetation and zonation: Beaman & Beaman, 1990; Kitayama, 1992). A formally protected area around Mt. Kinabalu was first gazetted in 1964 as 'Kinabalu National Park', which in 1984 became a state park under the authorities of 'Sabah Parks Trustees' (Nais & Lamri Ali, 1991). A thirty years' lease for a mining concession for an area of almost 25 km² from inside the park north of Ranau was given in 1972 to the Mamut Copper Mine Company (Burrough, 1978), which is still in operation today. As compensation for the lost area the park was extended in 1974 by about 93 km² to encompass the former Mount Templar Forest Reserve at its northern boundaries. In 1984, however, the park boundaries were again redefined and partly streamlined under a new legislation resulting in a loss of another approximately 26 km² (Liew, 1996). At present, Kinabalu Park comprises an area of 753.7 km² (= ca. 291 square miles) and represents the second largest national park in the state of Sabah.

Due to its inaccessibility scientific exploration of Mt. Kinabalu started only in the second half of the last century following the first successful climb by Sir Hugh Low in 1851 (Jenkins, 1996). The first butterflies were probably collected from the mountain by the naturalist John Whitehead in 1887 (Whitehead, 1893; Moulton, 1915), and already between 1892 and 1894 a professional insect collector, Johannes (= John) Waterstradt, set up temporary residence on the mountain for a couple of months (Barlow, 1969). A number of the butterflies discovered by Waterstradt on Mt. Kinabalu were subsequently described as new taxa by Grose Smith (1887) and Staudinger (1892). A first scientific expedition with the main aim to collect insects on the mountain was undertaken in 1913 by J. C. Moulton from the Sarawak Museum, Kuching (Moulton, 1913), followed in 1929 by H. M. Pendlebury and F. N. Chasen then working as curators for the Federated Malay States Museum and Raffles Museum, Singapore, respectively (Pendlebury & Chasen, 1932; Jenkins, 1996).

In 1965, H. J. Banks, H. S. Barlow, and J. D. Holloway spent three months on and around the mountain collecting butterflies and moths as members of the Cambridge Expedition to Mt. Kinabalu, which resulted in the first list of Rhopalocera from the area (Barlow et al., 1971; Holloway & Robinson, 1978). In the following years, the construction of new facilities and providing of additional infrastructure in the park supported a constant influx of both amateur and professional butterfly collectors. A series of visits paid by K. Morishita, K. Otsuka, and colleagues since the 1960s to Kinabalu Park inspired the publication of 'Butterflies of Borneo' (Otsuka, 1988; Seki et al., 1991; Maruyama & Otsuka, 1991), a first illustrated treatment of all butterflies known from the island. The recently established entomological collections at a newly constructed natural history museum at Park Headquarters and the operation of a butterfly farm at Poring Hot Springs should greatly facilitate more detailed butterfly research at Kinabalu Park in the future.

DATA AND METHODS

The present check-list is primarily based on our own records accumulated during seven visits to Kinabalu Park between 1993 and 1996 totalling a period of eleven months. The first author stayed sixteen weeks during February to April and July to August 1994 at the park, in addition to three shorter visits in March/April 1993, December 1995 to January 1996, and in November 1996. Most of this time was spent at Park Headquarters, where he was engaged to help with the build-up of entomological collections at a local natural history museum. The second author stayed 6 weeks during August to September 1993, and 10 weeks from February to April 1994 at Poring Hot Springs, where he conducted a research project comparing butterfly diversity between forest canopy and understorey using transect and trapping techniques (Schulze, 1995). The third author spent four weeks in March - April 1994 at the park, mostly again at Poring Hot Springs but also at other locations, concentrating on natural history and life-cycle studies of Lycaenidae.

During all these visits records were kept of the butterfly species that were observed and identified on the wing, and of specimens netted or collected in baited traps (Schulze, 1995). Voucher specimens are deposited in the entomological collections of the Sabah Parks Natural History Museum at Kinabalu Park Headquarters, and in the institutional and private collections of the three authors. In addition to our own records, we have also included data from material deposited in the Sabah Parks collections by other visitors, particularly from members of the Japanese Overseas Volunteers Cooperation stationed in the park for various periods of time. Aside from these primary data, we have considered for this check-list published records for Kinabalu Park from the following sources: Barlow et al. (1971), Holloway & Robinson (1978), Maruyama & Otsuka (1991), Otsuka (1988), Robinson (1977), Seki et al. (1991), Takanami (1990, 1992), and Zaidi & Kayau (1995).

In the present list, we have included only species for which actual records from localities inside the present park boundaries could be found, with the exception of the bordering villages of Kiau, Kundasang (Mesilau), Poring, and the area of the Mamut Copper Mine, some of which originally formed part of the park. The location of all recording localities is indicated in a sketch map of the area (see Fig. 1). In addition, we have included a small number of species based on literature records, which only give 'Kinabalu' as locality without any more precise indications, and which we assume to have originated from what is presently park area.

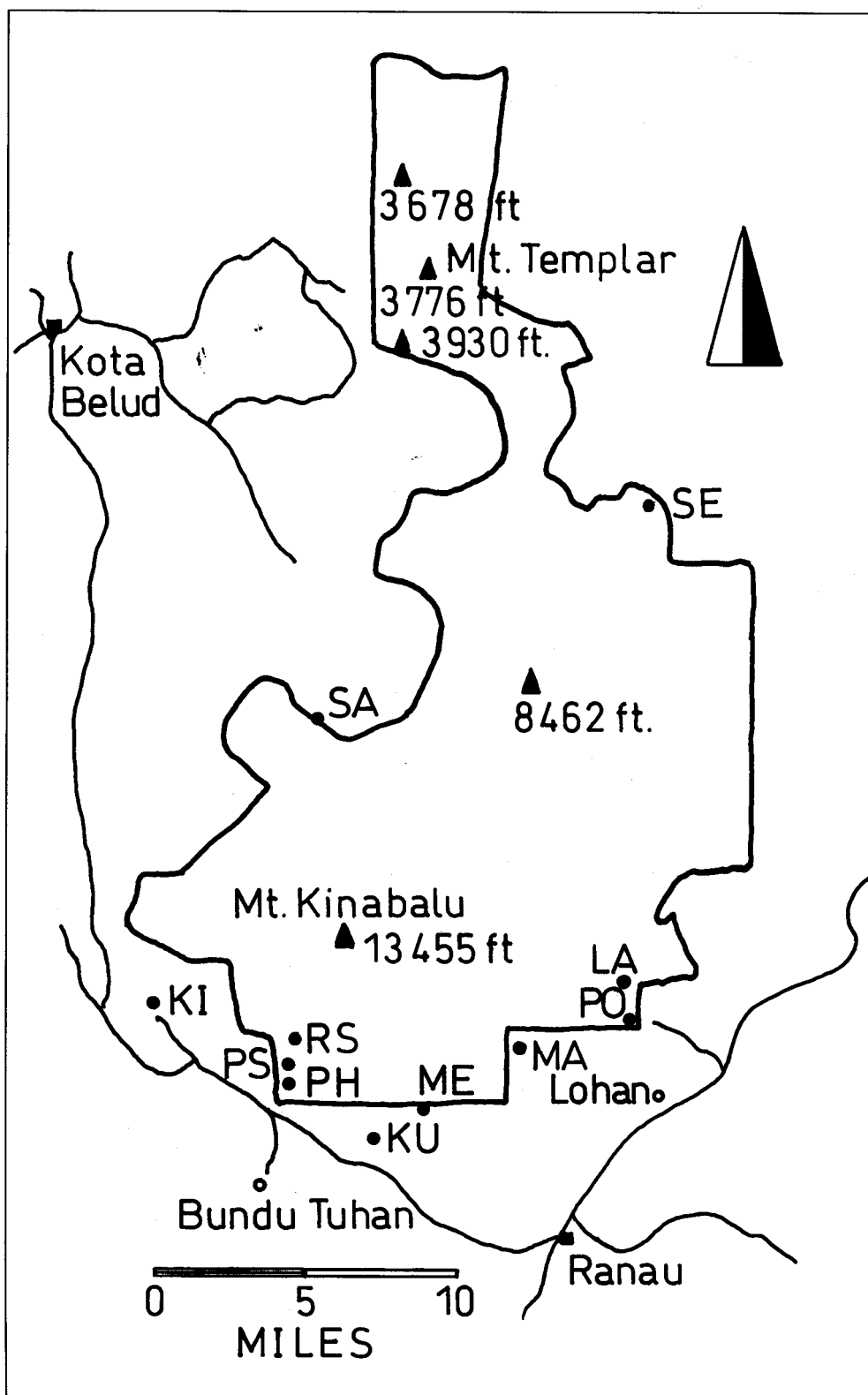


Fig. 1. Map of Mt Kinabalu National Park with main collection sites. For abbreviations see text.

SPECIES LIST

The check-list of butterfly species recorded from Kinabalu Park is presented in systematic order, and the species are arranged by family, subfamily, sometimes tribe, and genus. For taxonomy and nomenclature, we follow recent classifications and standard reference works for the region (Yata, 1985; Maruyama & Otsuka, 1991; Seki et al., 1991; Corbet & Pendlebury, 1992). Individual species within the genera, and genera within subfamilies and tribes, however, appear in pure alphabetic order for the ease of reference. As this list is only concerned with species, we have not considered any subspecies here; instead, species names are given in full including author and year. Species endemic to the island of Borneo are preceded by an asterisk '*'. For each species, the localities within the area of Kinabalu Park area listed from which they have been recorded. Locality names are abbreviated by two capital letters as explained below (see also Fig. 1):

- KI = Kampung Kiau, 6°03'N 116°30'E, ca 900 m (village located at the southeastern corner but outside the actual park area; in former times frequently used as an expedition base for the ascent of the mountain).
- KU = Kampung Kundasang, 5°59'N 116°34'E, ca 1,200 m (village on the main road from the coast to Ranau; formerly immediately adjacent to the park, today about 3 km from the southern park border; access point for Mesilau).
- LA = Langanan waterfall, 6°04'N 116°41'E, 800-1,000 m (near Poring Hot Springs, at the southwestern corner but inside the park; most records are from the forest trail leading from Poring Hot Springs to the Langanan waterfall).
- MA = Mamut Copper Mine area, 600-1,000 m (mining area southwest of Poring outside the actual park area, but inside the park when first gazetted; most records stem from the access road leading from Kampung Lohan to the main mining pit).
- ME = Mesilau plateau, 5°59'N 116°36'E, ca 1,500 m (northeast of Kundasang at the southern edge of the park; formerly part of the park but now harbors a golf course and mostly outside the present park boundaries).
- PH = Kinabalu Park Headquarters, 6°01'N 116°32'E, 1,200-1,500 m, (large area with park administration, tourist and research facilities at the southern edge of the park, north of the main Tamparuli - Ranau road, starting point of the Power Station road; here included are records from the Power Station road up to an elevation of about 1,500 m).
- PO = Kampung Poring and Poring Hot Springs, 6°03'N 116°42'E, 450-800 m (village outside and tourist recreation area inside the southeastern corner of the park).
- PS = Power Station road, 6°01'N 116°00'E, 1,600-2,000 m (paved road leading from Park Headquarters up to a power station which supplies the radio stations further up the mountain; access road for the summit trail).
- RS = Radio Sabah, 6°01'N 116°00'E, 2,200-2,600 m (two radio transmitting stations on the southern side of Mt. Kinabalu, located near the summit trail above the power station).

SA = Kampung Sayap and park substation, 6°12'N 116°33'E, 900-1,100 m (village at the western side of the park).

SE = Kampung Serinsim and park substation, 6°18'N 116°42'E, 400-600 m (village at the eastern side of the park).

FAMILY PAPILIONIDAE

SUBFAMILY PAPILIONINAE

TRIBE TROIDINI

Atrophaneura nox (Swainson, [1822])
PO, SE

Pachliopta aristolochiae (Fabricius, 1775)
KU, MA, ME, PH, PO, SA

P. neptunus (Guérin-Ménéville, 1840)
ME, PH

Trogonoptera brookiana (Wallace, 1855)
KU, LA, ME, PH, PO, PS, SA

Troides amphrysus (Cramer, [1782])
PO, SE

**T. andromache* (Staudinger, 1892)
MA, ME, PH, SA

T. helenus (Linnaeus, 1758)
PO, SE

TRIBE GRAPHIINI

Graphium (*Graphium*) *agamemnon* (Linnaeus, 1758)
PO, PH, SA

G. (Graphium) bathycles (Zincken, 1831)
KU, PO, SE

G. (Graphium) doson (Felder & Felder, 1864)
PO

G. (Graphium) eurypylus (Linnaeus, 1758)
PO

G. (Graphium) evemon (Boisduval, 1836)
PO

**G. (Graphium) procles* (Grose Smith, 1887)
ME, PH, PO, PS, SA

G. (Graphium) sarpedon (Linnaeus, 1758)
ME, PH, PO, SA, SE

G. (Pathysa) agetes (Westwood, 1841)
PO

G. (Pathysa) antiphates (Cramer, [1775])
MA, PO

G. (Pathysa) delesserti (Guérin, 1839)
PO

G. (Pathysa) macareus (Godart, 1819)
PO

**G. (Pathysa) stratiotes* (Grose Smith, 1897)
ME, PO, PS, SA

Lamproptera curius (Fabricius, 1787)
KI, PO, PS, SA

L. meges (Zincken 1831)
PH, PO, SA

TRIBE PAPILIONINI

Chilasa paradoxa (Zinken, 1831)
"Mt. Kinabalu" (Holloway & Robinson, 1978)

C. slateri (Hewitson, 1857)
PO

Meandrusa payeni (Boisduval, 1836)
LA, PO

**Papilio acheron* Grose Smith, 1887
PH, PO

P. demoleus Linnaeus, 1758
PO

P. demolion Cramer, [1776]
KU, PO, SE

P. fuscus Goeze, 1779
PO

P. helenus Linnaeus, 1758
KI, ME, PH, PO

P. iswaroides Fruhstorfer, 1897
PO

P. karna Felder & Felder, 1864
PH, SA

P. memnon Linnaeus, 1758
KU, MA, PH, PO, SA, SE

P. nephelus Boisduval, 1836
MA, PH, PO, SE

P. palinurus Fabricius, 1787
KU, PO, SE

P. polytes Linnaeus, 1758
PO, SE

FAMILY PIERIDAE

SUBFAMILY PIERINAE

- | | |
|--|--|
| <i>Appias albina</i> (Boisduval, 1836)
PO, SA | <i>D. henningia</i> (Eschscholtz, 1821)
PO |
| <i>A. cardena</i> (Hewitson, 1861)
KU, PH, SA | <i>D. hyparete</i> (Linnaeus, 1758)
PH, PO, PS |
| <i>A. indra</i> (Moore, [1858])
KU, MA, PH, PO, SA | <i>D. ninus</i> (Wallace, 1867)
PH, SA |
| <i>A. lyncida</i> (Cramer, [1779])
PH | <i>D. singhapura</i> (Wallace, 1867)
PS |
| <i>A. nero</i> (Fabricius, 1793)
PO | <i>Hebomoia glaucippe</i> (Linnaeus, 1758)
KU, PH, PO |
| <i>A. pandione</i> (Geyer, [1832])
KU, PH, PO, PS, RS, SA | <i>*Ixias undatus</i> (Butler, 1871)
PO, SA |
| <i>A. paulina</i> (Cramer, [1777])
PH, PO, RS, SA | <i>Leptosia nina</i> (Fabricius, 1793)
MA, PH, PO, SA |
| <i>Cepora iudith</i> (Fabricius, 1787)
MA, PH, PO, SA | <i>Pareronia valeria</i> (Cramer, [1776])
PO |
| <i>*C. pactolicus</i> (Butler, 1865)
PH, PO | <i>*Prioneris cornelia</i> (Snellen van Vollenhoven, 1865)
PO |
| <i>Delias baracasa</i> Semper, 1890
KU, PH | <i>*P. vollenhovii</i> Wallace, 1867
PO |
| <i>*D. cinerascens</i> Mitis, 1893
PH, PO, SA | <i>Saletara panda</i> (Godart, 1819)
PH, PO |
| <i>*D. eumolpe</i> Grose Smith, 1889
PH, PS, RS | |

SUBFAMILY COLIADINAE

- | | |
|---|---|
| <i>Catopsilia pomona</i> (Fabricius, 1775)
MA, PH, PO | <i>E. blanda</i> (Boisduval, 1836)
MA, PH, PO, SA |
| <i>C. pyranthe</i> (Linnaeus, 1758)
PH, PO | <i>E. hecabe</i> (Linnaeus, 1758)
LA, PH, PO, SA |
| <i>C. scylla</i> (Linnaeus, 1764)
PO | <i>E. lacteola</i> Distant, 1886
LA, ME, PH, PO, SA |
| <i>Dercas gobrias</i> (Hewitson, 1864)
KU, PH, PO, PS | <i>E. nicevillei</i> (Butler, 1898)
PO |
| <i>Eurema ada</i> Distant & Pryer, 1887
KU, LA, PH, PO, SA | <i>E. sari</i> (Horsfield, 1829)
PH, PO, SA |
| <i>E. alitha</i> (Felder & Felder, 1862)
PO | <i>E. simulatrix</i> Staudinger, 1891
PH, PO |
| <i>E. andersoni</i> Moore, 1886
MA, PO | <i>E. tominia</i> (Snellen van Vollenhoven, 1865)
KU, LA, MA, PH, PO, SA |
| | <i>Gandaca harina</i> (Horsfield, [1829])
PH, PO, PS |

FAMILY NYMPHALIDAE

SUBFAMILY DANAINAE

TRIBE DANAINI

- | | |
|---|---|
| <i>Danaus chrysippus</i> (Linnaeus, 1758)
ME, PO | <i>D. genutia</i> (Cramer, [1779])
PO, PS, SE |
| | <i>D. melanippus</i> (Cramer, [1777])
LA, MA, PO |

- Ideopsis gaura* (Horsfield, [1829])
PH, PO
- I. vulgaris* (Butler, 1874)
LA, MA, PO, PS
- Parantica agleoides* (Felder & Felder, 1860)
LA, MA, PH, PO
- P. aspasia* (Fabricius, 1787)
KI, LA, MA, PH, PO
- **P. crowleyi* Jenner-Weir, 1894
ME, PH, PS, RS
- P. luzonensis* (Felder & Felder, 1863)
MA, ME, PH, PO, PS
- Tirumala septentrionis* (Butler, 1874)
PH, PO, SA
- TRIBE EUPLOEINI**
- Euploea camaralzeman* Butler, 1866
PO, SA
- E. crameri* Lucas, 1853
PH, PO, PS
- E. eyndhovii* Felder & Felder, [1865]
PH, PS
- E. leucostictos* (Gmelin, 1790)
KU, PH, PS, RS
- E. modesta* Butler, 1866
PO, SA
- E. mulciber* (Cramer, [1777])
LA, PH, PO, PS, SA
- E. radamanthus* (Fabricius, 1793)
PO, PS, SA
- E. sylvester* (Fabricius, 1793)
PO, SA
- E. tulliolus* (Fabricius, 1793)
LA, PO
- Idea hypermnestra* (Westwood, 1848)
ME, PH
- I. stolli* (Moore, 1883)
KU, LA, PO, SA

SUBFAMILY SATYRINAE

- Coelites epiminthia* Westwood, [1851]
PO
- C. euptychioides* Felder & Felder, [1867]
PO
- **Cyllogenes woolletti* Riley, 1923
LA, PO
- Elymnias dara* Distant & Pryer, 1887
PO
- E. esaca* (Westwood, [1851])
PH, PO, SA
- E. nesaea* (Linnaeus, 1764)
MA, PO
- E. panthera* (Fabricius, 1787)
PO
- **E. pellucida* Fruhstorfer, 1895
PH, SA
- E. penanga* (Westwood, [1851])
PO
- Erites argentina* Butler, 1868
LA, PO
- E. elegans* Butler, 1868
PO
- Lethe delila* Staudinger, 1897
PH
- L. darena* (Felder & Felder, [1867])
PH, PO
- L. europa* (Fabricius, 1775)
PO
- L. mekara* (Moore, [1858])
PO
- **L. perimede* Staudinger, 1897
PH
- Melanitis leda* (Linnaeus, 1758)
PH, PO, SA
- M. zitenius* (Herbst, 1796)
PO
- **Mycalasis amoena* Druce, 1873
LA, PH, PO
- M. anapita* Moore, [1858]
PO
- M. fusca* (Felder & Felder, 1860)
KI, PO
- M. horsfieldi* (Moore, [1892])
PO
- M. janardana* Moore, [1858]
KI, PO
- **M. kina* Staudinger, 1892
PO
- M. maianaeas* Hewitson, [1864]
LA, PO, SA
- M. marginata* (Moore, 1881)
KI, LA, MA, ME, PH, PS, SA
- M. mineus* (Linnaeus, 1758)
PO
- M. oroatis* Hewitson, [1864]
LA, PO
- M. orseis* Hewitson, [1864]
KI, KU, LA, PO
- M. patiana* Eliot, 1969
PO
- Neorina lowii* (Doubleday, [1849])
PO
- Orsotriaena medus* (Fabricius, 1775)
PO, SE
- **Ptychandra talboti* Hobby, 1940
PH, PS
- **Ragadia annulata* Grose Smith, 1887
LA, ME, PH, PS, SA
- R. makuta* (Horsfield, [1829])
KI, LA, MA, PO
- Ypthima baldus* (Fabricius, 1775)
PO

Y. fasciata Hewitson, [1865]

KI, MA, PO, SA

Y. pandocus Moore, [1858]

KU, LA, MA, PH, PO, PS, SA

Xanthotaenia busiris Westwood, [1858]

LA, PO, SA

SUBFAMILY MORPHINAE

TRIBE AMATHUSINI

Amathusia phidippus (Linnaeus, 1763)

PO

Amathuxidia amythaon (Doubleday, 1847)

PH, PO

Discophora necho Felder & Felder, [1867]

PO

D. sondaica Boisduval, 1836

PO

**Enispe milvus* Staudinger, 1897

PH

Faunis gracilis (Butler, 1867)

LA, PO, SA

F. kirata (de Nicéville, 1891)

PO

F. stomphax (Westwood, 1858)

LA, PO, SA

Taenaris horsfieldii (Swainson, [1820])

KU, PO, SA

Thaumantis klugius (Zinken, 1831)

PO

T. nouredin Westwood, [1851]

LA, PO

T. odona (Godart, [1824])

LA, PO

Thauria aliris (Westwood, [1858])

PO

Zeuxidia amethystus Butler, 1865

PH, PO

Z. aurelius (Cramer, [1777])

PO

Z. doubledayi Westwood, [1851]

PH, PO

**Z. mesilauensis* Barlow, 1971

ME, PH

SUBFAMILY NYMPHALINAE

TRIBE HELICONIINI

SUBTRIBE ARGYNNITI

Cirrochroa emalea (Guérin-Ménéville, 1843)

PO, PS

C. malaya Felder & Felder, 1860

PO, SA

C. orissa Felder & Felder, 1860

KU, LA, PH, PS, SA

C. satellita Butler, 1869

PO, PS

C. tyche (Felder & Felder, 1861)

KU, PO

Cupha erymanthis (Drury, [1773])

PO, SA

Paduca fasciata (Felder & Felder, 1860)

KU, PO, PS

Phalanta alcippe (Stoll, [1782])

KU, PH, PO

Vagrans egista (Cramer, [1780])

KU, PH, PS

SUBTRIBE HELICONIITI

Cethosia hypsea Doubleday, [1847]

KI, KU, MA, PH, PO, SA

Terinos atlita (Fabricius, 1787)

PO

T. clarissa Boisduval, 1836

PO

T. terpander Hewitson, 1862

PO

Vindula dejone (Erichson, 1834)

PO

V. erota (Fabricius, 1793)

MA, ME, PO, SA

TRIBE NYMPHALINI

Hypolimnias anomala (Wallace, 1869)

PO

H. bolina (Linnaeus, 1758)

MA, PH, PO

H. misippus (Linnaeus, 1764)

KU

Junonia atlites (Linnaeus, 1763)

KU, MA, PH, PO, PS, SA

J. iphita (Cramer, [1779])

PO

Kallima limborgii Moore, [1879]

MA, PO

Kaniska canace (Linnaeus, 1763)

PH, PO, PS, RS, SA

Rhinopalpa polynice (Cramer, [1779])

MA, PO

Symbrenthia hippoclus (Cramer, [1779])

KU, ME, PH, PO, PS

S. hypatia (Wallace, 1869)

SA

S. hypselis (Godart, [1824])

KU, ME, PH, PO, SA

S. lilaea (Hewitson, 1864)

KU, PO

TRIBE CYRESTINI

Chersonesia intermedia Martin, 1895

PO

C. nicevillei Martin, 1895

PH

C. peraka Distant, 1884

PO, SA

C. rahria (Moore, [1858])

PO

C. risa (Doubleday, [1848])

KU, PO, SA

Cyrestis cocles (Fabricius, 1787)

PS

C. maenalis Erichson, 1834

KU, LA, MA, PH, PS, RS, SA

C. nivea (Zinken, 1831)

PH, PO, PS, SA

TRIBE LIMENITIDINI

SUBTRIBE LIMENITIDITI

Athyma adunora (Kheil, 1884)

PO

A. assa (de Nicéville, 1892)

KU, MA, PH, SA

A. asura Moore, 1858

PO, SA

A. cama Moore, 1858

PH, PO, PS

A. abiasa Moore, 1858

LA, PH, PO

A. kanwa Moore, 1858

PO

A. larymna (Doubleday, [1848])

KU, PO, PS

A. nefte (Cramer, [1779])

PH, PO, PS

A. pravara Moore, 1858

PO, PS

A. reta Moore, 1858

PO

A. selenophora (Kollar, [1844])

LA, ME, PH, PS, SA

Lasippa heliodore (Fabricius, 1787)

PO

L. monata (Weyenbergh, 1874)

PO

Moduza procris (Cramer, [1777])

KU, PH, PO, PS, SA

Neptis anjana Moore, 1881

PH

N. clinia Moore, 1872

KU, PO, SA

N. duryodana Moore, 1858

KI, PO

N. harita Moore, [1875]

PO

N. hylas (Linnaeus, 1758)

MA, PH, PO, SE

N. ilira Kheil, 1884

KU, PO

N. leucoporus Fruhstorfer, 1908

PH, PO

N. magadha Felder & Felder, [1867]

PO

N. miah Moore, 1858

MA, PH, PS

N. nata Moore, 1858

PH, PO, PS, SA

N. omeroda Moore, [1875]

PO

Pantoporia aurelia (Staudinger, 1886)

PO

P. hordonia (Stoll, [1790])

PO

P. paraka (Butler, [1879])

PH, PO

P. sandaka (Butler, 1892)

PO

Sumalia agneya (Doherty, 1891)

PO

S. daraxa (Doubleday, [1848])

KU, PH, PS

SUBTRIBE PARTHENITI

Lebadea martha (Fabricius, 1787)

PO

Parthenos sylvia (Cramer, [1775])

PO

SUBTRIBE ADOLIADITI

Bassarona dunya (Doubleday, [1848])

KI, PO, SA

B. teuta (Doubleday, [1848])

PO

Dophla evelina (Stoll, [1790])

PO

Euthalia aconthea (Cramer, [1777])

PO

E. agnis (Snellen van Vollenhoven, 1862)

PH

E. alpheda (Godart, [1824])

PO

E. kanda (Moore, 1859)

PH, PO

E. mahadeva (Moore, 1859)

PO

E. malaccana Fruhstorfer, 1899

PO

E. merta (Moore, 1858)

PO

E. monina (Fabricius, 1787)

KU, PO, SA

E. whiteheadi Grose Smith, 1889

KU

Lexias canescens (Butler, [1869])

PH, PO

L. dirtea (Fabricius, 1793)

LA, PH, PO, SA

L. pardalis (Moore, 1878)

PO

**Tanaecia amisa* Grose Smith, 1889

LA, ME, PH, PS, SA

T. aruna (Felder & Felder, 1860)

PO

T. clathrata (Snellen van Vollenhoven, 1862)

PH, PO

T. iapis (Godart, [1824])

PH, PO

T. munda Fruhstorfer, 1899

PH, PO

T. pelea (Fabricius, 1787)

MA, PO

TRIBE PSEUDERGOLINI

Amnosia decora Doubleday, [1849]

LA, PO, SA

Dichorragia nesimachus (Doyère, [1840])

PO

**Stibochiona schoenbergeri* Honrath, 1889

KU, LA, MA, PO

TRIBE APATURINI

Eulaceura osteria (Westwood, [1850])

PO

Euripus nyctelius (Doubleday, 1845)

MA, PO, SA

Herona sumatrana Moore, 1881

PO

Rohana nakula (Moore, [1858])

KU, PO

R. parisatis (Westwood, [1850])

KU, PH, PO, PS

SUBFAMILY CHARAXINAE

TRIBE PROTHOINI

Agatasa calydonia (Hewitson, [1854])

PO

Prothoe franck (Godart, [1824])

PO

TRIBE CHARAXINI

Charaxes bernardus (Fabricius, 1793)

PO, SA

C. borneensis Butler, 1869

PO

C. distant Honrath, 1885

PO

C. durnfordi Distant, 1884

PO

C. solon (Fabricius, 1793)

PO

Polyura athamas (Drury, [1773])

KU, MA, PO

P. delphis (Doubleday, 1843)

PO

P. hebe (Butler, [1866])

PO

P. moori (Distant, 1883)

MA

SUBFAMILY LIBYTHEINAE

Libythea myrrha Godart, 1819

PH, PO, PS, SA

FAMILY LYCAENIDAE

SUBFAMILY RIODININAE

Abisara geza Fruhstorfer, 1904

PH, PO

A. kausambi Felder & Felder, 1860

PO

A. savitri Felder & Felder, 1860

LA, PH, PO

Dodona deodata Hewitson, 1876

PH

**D. elvira* Staudinger, 1896

KU, MA, PH, PS, SA

Laxita thuisto (Hewitson, [1861])

PH, SA

Taxila haquinus (Fabricius, 1793)

LA, MA, PH, PO

Paralaxita damajanti (Felder & Felder, 1860)

PH, PO, SA

P. orphna (Boisduval, 1836)

LA, PO

P. telesia (Hewitson, [1861])

PO

Zemeros emesoides Felder & Felder, 1860

PO, PS

Z. flegyas (Cramer, [1780])

KI, KU, LA, MA, ME, PH, PO, PS, SA

SUBFAMILY PORITIINAE

- Deramas alixae* Eliot, 1978
 "Gn. Kinabalu" (Seki et al. 1991)
D. jasoda (de Nicéville, [1899])
 "Gn. Kinabalu" (Seki et al. 1991)
D. nelvis Eliot, 1964
 MA
Poritia erycinoides (Felder & Felder, [1865])
 LA, MA, PO, SA
P. phama Druce, 1895
 KU
 **P. phormedon* Druce, 1895
 "Kinabalu" (Seki et al. 1991)
- P. plateni* Staudinger, 1889
 KU
P. sumatrae (Felder & Felder, [1865])
 PO
Simiskina pasira (Moulton, 1911)
 SA
S. phalena (Hewitson, 1874)
 PO
S. philura (Druce, 1895)
 PO

SUBFAMILY MILETINAE

TRIBE MILETINI

- Allotinus (Allotinus) albifasciatus* Eliot, 1980
 MA
A. (Allotinus) fallax Felder & Felder, [1865]
 "Gn. Kinabalu" (Seki et al. 1991)
 **A. (Allotinus) otsukai* Takanami & Seki, 1990
 MA
A. (Allotinus) subviolaceus Felder & Felder, [1865]
 PO
 **A. (Fabitaras) bidiensis* Eliot, 1986
 "Gn. Kinabalu" (Seki et al. 1991)
A. (Fabitaras) fabius (Distant & Pryer, 1887)
 MA, PO, SA
A. (Fabitaras) portunus (de Nicéville, 1894)
 MA, SA
A. (Fabitaras) sarrastes Fruhstorfer, 1913
 PO
A. (Paragerydus) apries Fruhstorfer, 1913
 PO
A. (Paragerydus) melos (Druce, 1896)
 PO
 **A. (Paragerydus) parapus* Fruhstorfer, 1913
 "Gn. Kinabalu" (Seki et al. 1991)
A. (Paragerydus) substrigosus (Moore, 1884)
 LA, PO
A. (Paragerydus) unicolor Felder & Felder, [1865]
 MA
- Logania distanti* Semper, 1889
 PO, SA
L. malayica Distant, 1884
 LA, PO
L. regina (Druce, 1873)
 PO
Miletus ancon (Doherty, 1889)
 LA, MA, PO
 **M. cellarius* (Fruhstorfer, 1913)
 "Kinabalu" (Seki et al. 1991)
M. gaetulus (de Nicéville, 1894)
 PO
M. gopara (de Nicéville, 1890)
 LA, MA, PO
M. heracleion (Doherty, 1891)
 LA, PO
M. zinckenii Felder & Felder, [1865]
 "Gn. Kinabalu" (Seki et al. 1991)

TRIBE TARAKINI

- Taraka hamada* (Druce, 1875)
 MA, PO

TRIBE SPALGINI

- Spalgis epius* (Westwood, [1851])
 PO, SA

SUBFAMILY POLYOMMATINAE

TRIBE POLYOMMATINI

- Actyolepis puspa* (Horsfield, [1828])
 PO
Caleta elna (Hewitson, [1876])
 LA, MA, PO, SA
 **C. manovus* (Fruhstorfer, 1918)
 MA, PO, SA
Callenya lenya (Evans, 1932)
 KU, LA, SA
- Catopyrops ancyra* (Felder, 1860)
 MA, PO, SA
C. panormus (Felder, 1860)
 PO
Celarchus (Armentulus) shelfordii (de Nicéville, 1902)
 PH, PS
Celastrina algernoni (Fruhstorfer, 1917)
 KU, MA, PH, PO, PS, SA

- C. lavendularis* (Moore, 1877)
KU, PO, SA
- Discolampa ethion* (Westwood, [1851])
MA, PO, SA
- Euchrysops cnejus* (Fabricius, 1798)
PO
- Ionolyce helicon* (Felder, 1860)
PH, PO, PS, SA
- Jamides alecto* (Felder, 1860)
MA, PH, PO, PS, SA
- J. aratus* (Stoll, [1781])
PO
- J. bochus* (Stoll, [1782])
MA, PH, PO, SA
- J. caeruleus* (Druce, 1873)
MA, PH, PO, SA
- J. callistus* (Röber, [1886])
PO
- J. celeno* (Cramer, [1775])
MA, PO
- J. elpis* (Godart, [1824])
LA, PO, PS
- **J. limes* (Druce, 1895)
"Gn. Kinabalu" (Seki et al. 1991)
- **J. lugine* (Druce, 1895)
PO
- J. pura* (Moore, 1886)
MA, PH, PO, SA
- J. talinga* (Kheil, 1884)
PO, PS
- J. virgulatus* (Druce, 1895)
LA, MA, PO
- Lampides boeticus* (Linnaeus, 1767)
MA
- Megisba malaya* (Horsfield, 1828)
PH, PO, SA
- Monodontides (Monodontides) musina* (Snellen, 1892)
MA, PH, PO, SA
- Nacaduba angusta* (Druce, 1873)
PO
- N. beroe* (Felder & Felder, [1865])
LA, PO
- N. calauria* (Felder, 1860)
PO
- N. hermus* (Felder, 1860)
PO
- N. kurava* (Moore, [1858])
LA, MA, PO
- N. pactolus* (Felder, 1860)
PO, PS
- N. russelli* Tite, 1963
PO
- N. sanaya* Fruhstorfer, 1916
PO
- N. solta* Eliot, 1955
PO
- Neopithecops zalmora* (Butler, 1870)
PO, SA
- Petrelaea dana* (de Nicéville, [1884])
PO, SA
- Pithecops corvus* Fruhstorfer, [1919]
PH, PO
- Plautella cossaea* (de Nicéville, 1895)
MA, PH, PO, PS, SA
- Prosotas aluta* (Druce, 1873)
PO, PS, SA
- P. bhutea* (de Nicéville, [1884])
PO, SA
- P. dubiosa* (Semper, [1879])
MA, PO, SA
- P. gracilis* (Röber, 1886)
PO
- P. nora* (Felder, 1860)
PO, SA
- P. pia* Toxopeus, 1929
LA, PH, PO, PS, SA
- Tarucus waterstradti* Druce, 1895
"Gn. Kinabalu" (Seki et al. 1991)
- Udara (Selmanix) selma* (Druce, 1895)
PH, PS
- U. (Udara) camenae* (de Nicéville, 1895)
MA, PH, SA
- U. (Udara) cyma* (Toxopeus, 1927)
PO, PS
- U. (Udara) dilecta* (Moore, 1879)
MA, PH, PO, SA
- U. (Udara) dilectissima* (Druce, 1895)
MA, PH, PO, SA
- U. (Udara) placidula* (Druce, 1895)
PH, PS, SA
- Una usta* (Distant, 1886)
KU, PO
- Zizina otis* (Fabricius, 1787)
PH, PO

TRIBE NIPHANDINI

- Niphanda cymbia* de Nicéville, [1884]
PO, SA

TRIBE LYCAENESTHINI

- Anthene emolus* (Godart, [1824])
PO
- A. lycaenina* (Felder, 1868)
PO

SUBFAMILY LYCAENINAE

- **Heliophorus kiana* (Grose Smith, 1889)
MA, PH, PO

SUBFAMILY THECLINAE

TRIBE THECLINI

**Austrozephyrus borneanus* (Pendlebury, 1939)
PH

TRIBE ARHOPALINI

- Arhopala ace* de Nicéville, [1893]
"Gn. Kinabalu" (Seki et al. 1991)
A. agesias (Hewitson, 1862)
SA
A. agrata de Nicéville, 1890
PO
**A. alica* (Evans, 1957)
PO
A. ammon (Hewitson, 1862)
PO
A. amphinota (Felder & Felder, 1860)
PO
**A. apurpurosa* (Barlow, Banks & Holloway, 1971)
"Gn. Kinabalu" (Seki et al. 1991)
A. antimuta Felder & Felder, [1865]
PO
A. avatha de Nicéville, [1896]
"Gn. Kinabalu" (Seki et al. 1991)
A. azinis de Nicéville, [1896]
"Gn. Kinabalu" (Seki et al. 1991)
**A. baluensis* Bethune-Baker, 1904
MA
**A. bella* Bethune-Baker, 1896
"Kinabalu" (Seki et al. 1991)
**A. borneensis* Bethune-Baker, 1896
PO
A. democritus (Fabricius, 1793)
PO
A. elopura Druce, 1894
PO
A. havilandi Bethune-Baker, 1896
"Gn. Kinabalu" (Seki et al. 1991)
A. horsfieldi (Pagenstecher, 1890)
PO
A. kinabala Druce, 1895
"Gn. Kinabalu" (Seki et al. 1991)
A. muta (Hewitson, 1862)
PO
A. normani Eliot, 1972
PO
A. paraganesa (de Nicéville, 1882)
PH, PO
A. phanda Corbet, 1941
LA
A. pseudocentaurus (Doubleday, 1847)
PO
A. pseudomuta (Staudinger, 1889)
PO
A. similis Druce, 1895
"Gn. Kinabalu" (Seki et al. 1991)
A. sublustris Bethune-Baker, 1902
"Gn. Kinabalu" (Seki et al. 1991)

- Flos anniella* (Hewitson, 1862)
LA
F. morphina (Distant, 1884)
PO
Surendra florimel Doherty, 1889
PO
S. vivarna (Horsfield, [1829])
PO

TRIBE AMBLYPODIINI

- Iraota abnormis* (Moulton, 1911)
"Gn. Kinabalu" (Seki et al. 1991)
I. distanti (Staudinger, 1889)
PO, SA
I. rochana (Horsfield, [1829])
PO

TRIBE APHNAEINI

- Spindasis kutu* Corbet, 1940
"Mt. Kinabalu" (Holloway & Robinson, 1978)
S. seliga (Fruhstorfer, [1912])
"Gn. Kinabalu" (Seki et al. 1991)
S. syama (Horsfield, [1829])
"Kinabalu" (SEKI et al. 1991)

TRIBE CATAPAECILMATINI

- Catapaecilma elegans* (Druce, 1873)
PO
C. evansi Pendlebury, 1933
PO

TRIBE LOXURINI

- Drina cowani* Corbet, 1940
"Mt. Kinabalu" (Holloway & Robinson, 1978)
**Eooxylides etias* Distant & Pryer, 1887
LA, PO
E. tharis (Geyer, 1837)
KU, LA, MA, PO, SA
Loxura cassiopeia Distant, 1884
PO

TRIBE CHERITRINI

- Cheritra freja* (Fabricius, 1793)
PO
**Drupadia cineas* (Grose Smith, 1889)
"Kinabalu" (Seki et al. 1991)
**D. cinesia* (Hewitson, [1863])
PO
D. estella (Hewitson, [1863])
LA
D. ravindra (Horsfield, [1828])
LA, MA, PO, SA
D. rufotaenia (Fruhstorfer, [1912])
PO
D. scaeva (Hewitson, [1863])
MA, PO

- D. theda* (Felder & Felder, 1862)
LA, MA, PO
Ticherra acte (Moore, [1858])
"Gn. Kinabalu" (Seki et al. 1991)

TRIBE IOLAINI

- **Britomartis igarashii* Hayashi, 1976
PH, PO
**Bullis stigmata* (Druce, 1904)
"Gn. Kinabalu" (Seki et al. 1991)
Dacalana cremera (de Nicéville, 1894)
"Gn. Kinabalu" (Seki et al. 1991)
Jacoonia anasuja (Felder & Felder, [1865])
"Kinabalu" (Seki et al. 1991)
Manto hypoleuca (Hewitson, [1865])
PO
Mantoides gama (Distant, 1886)
"Gn. Kinabalu" (Seki et al. 1991)
Neocheritra amrita (Felder & Felder, 1860)
"Kinabalu" (Seki et al. 1991)
Pratapa deva (Moore, [1858])
"Kinabalu" (Seki et al. 1991)
P. icetoides (Elwes, [1893])
"Gn. Kinabalu" (Seki et al. 1991)
Suasa lisides (Hewitson, [1863])
PO
**Sukidion inores* (Hewitson, 1872)
MA
Tajuria berenis Druce, 1896
"Gn. Kinabalu" (Seki et al. 1991)
T. deudorix (Hewitson, 1869)
"Gn. Kinabalu" (Seki et al. 1991)
T. dominus Druce, 1895
"Gn. Kinabalu" (Seki et al. 1991)
T. inexpectata Eliot, 1973
"Gn. Kinabalu" (Seki et al. 1991)
T. isaeus (Hewitson, [1865])
MA
**T. lucullus* Druce, 1904
"Gn. Kinabalu" (Seki et al. 1991)
T. maculata (Hewitson, [1865])
PO
T. mantra (Felder & Felder, 1860)
PO
T. yajna (Doherty, 1886)
"Gn. Kinabalu" (Seki et al. 1991)
Thrix scopula (Druce, 1873)
SA

TRIBE REMELANINI

- Ancema blanka* (de Nicéville, 1894)
SA
Remelana jangala (Horsfield, [1829])
PO

TRIBE HYPOLYCAENINI

- Hypolycaena amabilis* (de Nicéville, [1895])
PO
H. amasa (Hewitson, [1865])
PO, SA
H. erylus (Godart, [1824])
PO
H. merguia (Doherty, 1889)
PO, SA
H. othona (Hewitson, [1865])
MA, PO, SA

TRIBE DEUDORIGINI

- Araotes lapithis* (Moore, [1858])
PO
Artipe anna (Druce, 1896)
"Gn. Kinabalu" (Seki et al. 1991)
Bindahara phocides (Fabricius, 1793)
PO
Deudorix epijarbas (Moore, [1858])
PH, PO
D. hypargyria (Elwes, [1893])
"Kinabalu" (Seki et al. 1991)
Rapala damona Swinhoe, 1890
"Gn. Kinabalu" (Seki et al. 1991)
R. dienece (Hewitson, 1878)
PO
R. hades (de Nicéville, [1895])
PO
R. manea (Hewitson, [1863])
PO
R. pheretima (Hewitson, [1863])
MA, PH, PO
R. rhodopis de Nicéville, [1896]
PO
R. rhoecus de Nicéville, [1895]
MA, PO
R. scintilla de Nicéville, 1890
PH
R. suffusa (Moore, [1879])
"Gn. Kinabalu" (Seki et al. 1991)
R. varuna (Horsfield, [1829])
PO
**Sinthusia makikoe* Hayashi & Otsuka, 1985
PS, SA
S. nasaka (Horsfield, [1829])
PH, PO
S. privata Fruhstorfer, 1912
MA, PH, PO, SA
**Sithon micea* (Hewitson, 1869)
PO
S. nedymond (Cramer, [1780])
LA
Virachola kessuma (Horsfield, [1829])
PO
V. smilis (Hewitson, [1863])
"Kinabalu" (Seki et al. 1991)

SUBFAMILY CURETINAE

Curetis insularis (Horsfield, [1829])
PO

C. sperthis (Felder & Felder, [1865])
PO

FAMILY HESPERIIDAE

SUBFAMILY COELIADINAE

Badamia exclamatoris (Fabricius, 1775)
PO

Bibasis sena (Moore, [1866])
SA

Burara etelka (Hewitson, [1867])
"Kinabalu" (Maruyama, 1991)

B. gomata (Moore, [1866])
PO

B. harisa (Moore, [1866])
PO

B. jaina (Moore, [1866])
"Kinabalu" (Maruyama, 1991)

B. oedipodaea (Swainson, [1820])
PO

Chaospes plateni (Staudinger, 1888)
PH

C. subcaudatus (Felder & Felder, [1867])
"Kinabalu" (Maruyama, 1991)

Hasora badra (Moore, [1858])
PO

H. borneensis Elwes & Edwards, 1897
PH, PS

H. khoda (Mabille, 1876)
PO, SA

H. leucospila (Mabille, 1891)
"Kinabalu" (Maruyama, 1991)

H. mavis Evans, 1934
"Kinabalu" (Maruyama, 1991)

H. mixta (Mabille, 1876)
PO

H. mus Elwes & Edwards, 1897
PH, PS

H. quadripunctata (Mabille, 1876)
"Kinabalu" (Maruyama, 1991)

H. salanga (Plötz, 1885)
"Kinabalu" (Maruyama, 1991)

H. schoenherr (Latreille, [1824])
PO

H. taminatus (Hübner, [1818])
PO

H. vitta (Butler, 1870)
PH

SUBFAMILY PYRGINAE

Capila phanaeus (Hewitson, 1867)
PO

C. pieridoides (Moore, 1878)
"Kinabalu" (Maruyama, 1991)

Celaenorrhinus asmara (Butler, [1879])
PO

C. aurivittatus (Moore, [1879])
"Kinabalu" (Maruyama, 1991)

C. dhanada (Moore, [1866])
MA, PH, PO, SA

C. ficulnea (Hewitson, 1868)
LA

C. inaequalis Elwes & Edwards, 1897
"Kinabalu" (Maruyama, 1991)

C. ladana (Butler, 1870)
PO, SA

C. nigricans (de Nicéville, 1885)
PH

C. putra (Moore, [1866])
LA, PO

Coladenia agni (de Nicéville, [1884])
"Kinabalu" (Maruyama, 1991)

C. palawana (Staudinger, 1889)
MA, PO

Darpa pteria (Hewitson, 1868)
PO

D. striata (Druce, 1873)
MA

Gerosia limax (Plötz, 1884)
PO

Mooreana trichoneura (Felder & Felder, 1860)
PO, SA

Odontoptilum angulatum (Felder, 1862)
PO

O. pygela (Hewitson, 1868)
MA, PO

Pseudocoladenia dan (Fabricius, 1787)
"Kinabalu" (Maruyama, 1991)

Tapena thwaitesi Moore, [1881]
"Kinabalu" (Maruyama, 1991)

Satarupa gopala Moore, [1866]
"Kinabalu" (Maruyama, 1991)

Seseria affinis (Druce, 1873)
"Kinabalu" (Maruyama, 1991)

- S. sesame* Evans, 1949
PO
Tagiades calligana Butler, [1879]
"Kinabalu" (Maruyama, 1991)
T. gana (Moore, [1866])
PO
T. japetus (Stoll, [1781])
PO, SA
T. lavatus Butler, [1879]
LA, PO, SA
- T. parra* Fruhstorfer, 1910
PO
T. toba de Nicéville, 1896
"Kinabalu" (Maruyama, 1991)
T. trebellius (Hopffer, 1874)
MA, PO
T. ultra Evans, 1932
MA, ME, PO
T. waterstradti Elwes & Edwards, 1897
PH, SA

SUBFAMILY HESPERIINAE

- Acerbas anthea* (Hewitson, 1868)
PO
A. duris (Mabille, 1883)
PO
A. martini (Distant & Pryer, 1887)
"Kinabalu" (Maruyama, 1991)
Aeromachus jhora (de Nicéville, 1885)
PH, PS
Ampittia dioscorides (Fabricius, 1793)
"Kinabalu" (Maruyama, 1991)
Ancistroides armatus (Druce, 1873)
LA, PO, SA
A. gemmifer (Butler, [1879])
MA, PO
A. nigrita (Latreille, [1824])
LA, PO
Arnetta verones (Hewitson, 1878)
"Kinabalu" (Maruyama, 1991)
Baoris farri (Moore, 1878)
PO
B. oceia (Hewitson, [1868])
MA
B. pagana (de Nicéville, 1887)
"Kinabalu" (Maruyama, 1991)
B. penicillata Moore, 1881
MA, PO
Borbo cinnara (Wallace, 1866)
PO
Caltois brunnea (Snellen, 1876)
PH
C. cormasa (Hewitson, 1876)
MA, PO, SA
**C. kinabaluna* Maruyama, 1989
PH
C. kumara (Moore, 1878)
LA, PH
C. malaya (Evans, 1926)
MA
C. philippina (Herrich-Schäffer, 1869)
"Kinabalu" (Maruyama, 1991)
C. plebeia (de Nicéville, 1887)
"Kinabalu" (Maruyama, 1991)
C. sirius (Evans, 1926)
"Kinabalu" (Maruyama, 1991)
Creteus cyrina (Hewitson, 1876)
MA, PH
- Cuphita purrea* (Moore, 1877)
MA, PO
Eetion elia (Hewitson, [1866])
"Kinabalu" (Maruyama, 1991)
Erionota thrax (Linnaeus, 1767)
PO
Gangara thyrsis (Fabricius, 1775)
PO
Ge geta de Nicéville, [1895]
"Kinabalu" (Maruyama, 1991)
Halpe clara Cassidy, 1985
PH
**H. fasciata* Elwes & Edwards, 1897
PH
H. ormenes (Plötz, 1886)
PO
H. pelethronix Fruhstorfer, 1910
PO
H. sikkima (Moore, 1882)
PO
H. toxopea Evans, 1932
"Kinabalu" (Maruyama, 1991)
H. veluvana Fruhstorfer, 1911
"Kinabalu" (Maruyama, 1991)
H. zema (Hewitson, 1877)
MA, PO
Hidari doesoena Martin, 1895
"Kinabalu" (Maruyama, 1991)
H. irava (Moore, [1858])
PO
Hyarotis iadera (de Nicéville, [1895])
MA
Iambrix stellifer (Butler, [1897])
LA, PO
Idmon latifascia (Elwes & Edwards, 1897)
MA, PO
I. obliquans (Mabille, 1893)
PO
**Isma binotatus* (Elwes & Edwards, 1897)
PH
**I. cinnamomea* (Elwes & Edwards, 1897)
PH
I. cronus (de Nicéville, 1894)
"Kinabalu" (Maruyama, 1991)
I. feralia (Hewitson, 1868)
MA, PO

- I. guttulifera* (Elwes & Edwards, 1897)
 "Kinabalu" (Maruyama, 1991)
- I. iapis* (de Nicéville, 1890)
 MA, PO
- I. miosticta* (de Nicéville, 1891)
 "Kinabalu" (Maruyama, 1991)
- I. protoclea* (Herrich-Schäffer, 1869)
 "Kinabalu" (Maruyama, 1991)
- I. umbrosa* (Elwes & Edwards, 1897)
 PO
- Iton semamora* (Moore, [1866])
 MA, PH, PO
- *Koruthaialos frena* Evans, 1949
 MA, PH, SA
- K. rubecula* (Plötz, 1882)
 LA, MA, PO, SA
- K. sindu* (Felder & Felder, 1860)
 MA, PO, SA
- Lotongus avesta* (Hewitson, 1868)
 "Kinabalu" (Maruyama, 1991)
- L. calathus* (Hewitson, 1876)
 MA
- Matapa aria* (Moore, [1866])
 PO
- M. cresta* Evans, 1949
 PO
- M. druna* (Moore, [1866])
 "Kinabalu" (Maruyama, 1991)
- Notocrypta clavata* (Staudinger, 1889)
 MA, PO, SA
- N. curvifascia* (Felder & Felder, 1862)
 MA, PO
- N. paralydos* (Wood-Mason & de Nicéville, 1881),
 MA, PH, PO, SA
- N. pria* (Druce, 1873)
 MA, PO
- N. quadrata* Elwes & Edwards, 1897
 "Kinabalu" (Maruyama, 1991)
- Oerane microthyrus* (Mabille, 1883)
 "Kinabalu" (Maruyama, 1991)
- Oriens gola* (Moore, 1877)
 LA, MA, PO, SA
- Parnara naso* (Fabricius, 1798)
 PO
- Pelopidas agna* (Moore, [1866])
 PO
- P. conjunctus* (Herrich-Schäffer, 1869)
 MA, PH, PO, SA
- Pemara pugnans* (de Nicéville, 1891)
 PO
- *Piridana albicornis* Elwes & Edwards, 1897
 "Kinabalu" (Maruyama, 1991)
- P. distanti* Staudinger, 1889
 MA, PO
- Pithauria marsena* (Hewitson, [1866])
 PO
- Plastingia naga* (de Nicéville, [1884])
 "Kinabalu" (Maruyama, 1991)
- Polytremis lubricans* (Herrich-Schäffer, 1869)
 MA, PO
- *Potanthus ayakoe* Ohtsuka, 1982
 PH
- P. ganda* (Fruhstorfer, 1911)
 LA, MA, PH, PO, SA
- P. omaha* (Edwards, 1863)
 MA, PO, SA
- P. pamela* (Evans, 1934)
 MA, PO
- P. trachala* (Mabille, 1878)
 MA, PH, PO
- Prusiana kuehni* (Plötz, 1886)
 PO
- Pseudokerana fulgur* (de Nicéville, 1894)
 MA, PO
- Psolos fuligo* (Mabille, 1876)
 PO
- Pyroneura aurantiaca* (Elwes & Edwards, 1897)
 "Kinabalu" (Maruyama, 1991)
- P. callineura* (Felder & Felder, [1867])
 "Kinabalu" (Maruyama, 1991)
- P. derna* (Evans, 1941)
 PO
- P. latoia* (Hewitson, 1868)
 PO
- *Quedara inornata* (Elwes & Edwards, 1897)
 "Kinabalu" (Maruyama, 1991)
- Q. monteithi* (Wood-Mason & de Nicéville, [1887])
 PO
- Salanoemia sala* (Hewitson, [1866])
 PO
- Scobura phiditia* (Hewitson, [1866])
 PO
- Suastus everyx* (Mabille, 1883)
 PO
- Taractrocera ardonia* (Hewitson, [1868])
 PO
- Telicota augias* (Linnaeus, 1763)
 "Kinabalu" (Maruyama, 1991)
- T. besta* Evans, 1949
 MA, PO
- T. hilda* Eliot, 1959
 "Kinabalu" (Maruyama, 1991)
- T. ohara* (Plötz, 1883)
 MA, PH, PO, SA
- *T. santa* Evans, 1934
 KU, MA, PH, PO
- Unkana ambasa* (Moore, [1858])
 "Kinabalu" (Maruyama, 1991)
- Xanthoneura corissa* (Hewitson, 1876)
 PO
- *X. kazuhisai* Maruyama, 1989
 PH
- Zela excellens* (Staudinger, 1889)
 "Kinabalu" (Maruyama, 1991)

DISCUSSION

A total of 936 butterfly species has been listed for the island of Borneo by Otsuka (1988), Maruyama & Otsuka (1991), and Seki et al. (1991), but they failed to note *Ypthima hanburyi* described by Holloway (1984) from Gunung Mulu National Park in Sarawak. In the present survey of Kinabalu Park, we compiled records for 625 (66.7%) of the 937 known Bornean species, based on our own field work, on the examination of specimens preserved in collections and on published references. An exceptionally high proportion of the total Bornean butterfly fauna to be present at Kinabalu Park was found in Pieridae (90.5 %). Papilionidae (79.5%), Nymphalidae (76.9%), and Hesperidae (72.9%) are also well represented, whereas the coverage of Lycaenidae (53.2%) is still distinctly lower (Table 1). However, these between-family differences are probably due to recording bias (see below). Within the Lycaenidae, for example, the subfamilies Poritiinae and Theclinae with many rare species or canopy-specialists are as yet under-represented (<50% of the Bornean total), whereas Riodininae and Polyommatainae are relatively well covered (>66%). There is at present no reason to assume that the representation of families should broadly differ between the Mt. Kinabalu area and the entire island of Borneo. On the contrary, judging from our field experience and the figure already reached by Pieridae (which contain few canopy species and are, on average, easy to observe) we estimate that, across all butterfly families, Kinabalu Park will turn out to house some 80-90% of the entire Bornean butterfly fauna. Only species restricted to special habitats such as mangrove, peat swamp forest, or the wet forests along large rivers might really be absent.

The total figure of 625 species indicates that the number of butterfly species recorded for the area has doubled during the past thirty years. In an account of the results of their 1965 expedition, Barlow et al. (1971) present records for 340 butterfly species of which only 312 species came from the Mt. Kinabalu area, and in a short checklist Holloway & Robinson (1978) list only 290 species for the mountain. As a result, the area around Mt. Kinabalu now stands as the most diverse location on Borneo in terms of butterflies.

This becomes even more obvious when the present inventory is compared with species lists from other places in Borneo. Data are currently available for only two well-surveyed locations in northern Borneo, namely the Kuala Belalong Field Study Centre, situated in the Batu Apoi Forest Reserve, Brunei, and Gunung Mulu National Park, in northern Sarawak. From Kuala Belalong 342 butterfly species (= 36.5% of the Bornean total) were recorded during regular visits over two years (Orr & Häuser, 1996b), and 276 butterfly species (= 29.5% of the Bornean total) were found during five months surveying at Gunung Mulu National Park (Holloway, 1984). Thus, Kuala Belalong holds approximately half (= 54.9%), and Gunung Mulu only 44.3% of the species richness recorded for Kinabalu.

Four main factors seem to contribute to the considerably higher species richness recorded for Mt. Kinabalu when compared with Kuala Belalong and Gunung Mulu.

- (1) The area of Kinabalu Park is larger than those of the other two reserves. Whereas Kinabalu Park in its present boundaries includes an area of almost 754 km² (Liew, 1996), Gunung Mulu National Park covers about 529 km² (Jermy & Kavangh, 1984), and the Batu Apoi Forest Reserve around Kuala Belalong is only about 50 km² in size (Cranbrook & Edwards, 1994).

Table 1. Total species numbers and numbers of endemics recorded for Borneo and Mt. Kinabalu by family and subfamily (except for Papilionidae and Pieridae), and percentages of Bornean total. For taxa with less than 10 Bornean species, percentages are enclosed in parentheses.

FAMILY/ SUBFAMILY	Number of species for Borneo	Number of species at Mt Kinabalu	Proportion of Bornean total [%]	Number of endemic spp. in Borneo	Number of Bornean endemic spp. at Mt Kinabalu	Proportion of Bornean endemics total [%]
PAPILIONIDAE	44	35	79.5	4	4	100.0
PIERIDAE	42	38	90.5	6	6	100.0
NYPHALIDAE	242	186	76.9	19	12	63.2
Danainae	28	21	75.0	1	1	(100.0)
Morphinae	24	17	70.8	2	2	(100.0)
Satyrinae	50	39	78.0	10	7	70.0
Nymphalinae	125	97	77.6	6	2	33.3
Charaxinae	14	11	78.6	-	-	-
Libytheinae	1	1	(100.0)	-	-	-
LYCAENIDAE	395	210	53.2	51	23	45.1
Riodininae	16	12	75.0	4	1	25.0
Poritiinae	24	11	45.8	2	1	(50.0)
Liphyrinae	1	-	(0.0)	-	-	-
Miletinae	41	24	58.5	5	4	80.0
Polyommatainae	87	58	66.7	8	3	37.5
Lycaeninae	1	1	(100.0)	1	1	(100.0)
Theclinae	217	102	47.0	31	13	41.9
Curetinae	8	2	(25.0)	-	-	-
HESPERIIDAE	214	156	72.9	12	10	83.3
Coeliadinae	24	21	87.5	-	-	-
Pyrginae	36	32	88.9	-	-	-
Hesperiinae	154	103	66.9	12	10	83.3
total	937	625	66.7	92	55	59.8

(2) Apart from the difference in area size, Kinabalu Park also offers a much larger altitudinal range, from about 300 m to 4,100 m. Gunung Mulu National Park ranging from about 100 m to 2,377 m could still be comparable, but Bukit Belalong, the highest peak in the Batu Apoi Reserve, reaches just 913 m, and the actual study area near the Kuala Belalong centre included only locations from 60 m to about 300 m in altitude (Orr & Häuser, 1996b). Probably for this reason alone, typical montane species like *Troides andromache*, *Graphium procles*, *Parantica crowleyi*, and many *Delias* and *Arhopala* species could not be recorded at Kuala Belalong.

(3) In addition, there is also a greater variety of habitat types available at Kinabalu Park, particularly regarding various levels of anthropogenic disturbance. Open, non-forest habitats, which are found commonly along the borders and locally also inside Kinabalu Park, are almost absent in Kuala Belalong and Gunung Mulu, where even secondary forest is rare (Holloway, 1984; Cranbrook & Edwards, 1994). This probably accounts for the absence or rarity of species such as *Papilio demoleus*, *Eurema hecabe*, *Danaus (Anosia) genutia*, *Parantica aspasia*, *Ypthima pandocus*, *Lampides boeticus*, and several *Hesperiinae* in both those areas (Holloway, 1984; Orr & Häuser, 1996a).

- (4) Finally, considerable differences exist regarding the data collecting efforts between the three areas. The butterfly fauna of Mt. Kinabalu has been much more intensely studied than those of the two other areas and, probably, than any other area on Borneo. While butterfly collecting around Mt. Kinabalu started already in the second half of the last century and surveying has been going on more or less regularly until today (see above, introduction), the exploration of the two other areas had to be accomplished during much shorter time periods. At Gunung Mulu National Park, Holloway (1984) and co-workers collected butterflies only for about five months in 1977/78, and in Kuala Belalong, only a total of 47 sampling days was spent over two years (Orr & Häuser, 1996a). In addition to the effects of time effort, technical aspects probably also contributed to the higher numbers found for Mt. Kinabalu, e.g., the recent availability of a permanent canopy access system at Poring Hot Springs and the regular use of butterfly traps (Schulze, 1995).

Despite this moderate sampling effort at Gunung Mulu and Kuala Belalong a comparatively high proportion of the papilionid and pierid species could be recorded there (50-70% of the Bornean total), whereas representation of the other families was much lower, ranging from 30-50% in the Nymphalidae and Riodininae, to 20% in the Lycaenidae (other than Riodininae), and 10% in the Hesperidae (Holloway, 1984; Orr & Häuser, 1996b). Three reasons probably account for this taxonomic difference in representation. (1) Many Hesperidae and Lycaenidae are less apparent and conspicuous due to their small size and (in some hesperiids) crepuscular activity. (2) Certain Lycaenidae occur at very small microsites and often in rather low densities because of their obligate association with specific ants (Fiedler, 1996; Seufert & Fiedler, 1996), which makes them less likely to be detected during shorter sampling periods. (3) Several groups of the Nymphalidae and Lycaenidae are typical canopy dwellers which only rarely are seen at ground level, and frequently escape notice without the use of appropriate techniques (Schulze, 1995). It can be safely expected, therefore, that quite a few more species of those families could be found to occur in the two other areas, which is also suggested by the species accumulation curve presented for Kuala Belalong (Orr & Häuser, 1996a:128).

Although butterfly species diversity recorded here for Mt. Kinabalu is impressive, there have already happened noticeable changes in the structure of the butterfly community at some locations in the park during the last 30 years. One example is *Troides brookiana*, which apparently occurred frequently around Park Headquarters in 1965 (Barlow et al., 1971), but is only rarely seen there nowadays. Still, the area is of major importance for butterfly conservation, not just because of the high number of individual species occurring within the area. Also, the high number of endemic species is noteworthy in this context. About 60% (= 56 species) of all butterfly species which are currently known as endemics for Borneo have been recorded from Kinabalu Park (Table 1). Most of these endemic species were first discovered on Kinabalu, but have later also been found in other parts of Borneo. Thus, truly endemic butterfly species for Mt. Kinabalu, if they exist at all, are probably very few. Possible candidates for such endemics of Mt. Kinabalu are, e.g., *Zeuxidia mesilauensis* and *Allotinus parapus*, but more extensive surveys at other areas must be awaited to further corroborate this.

Future survey work is also much needed at Kinabalu Park for a variety of reasons. The present check-list is surely not complete or free from mistakes and omissions, and for most species small-scale distribution, abundance and population dynamics inside the park area are still largely unknown. It should also be pointed out that the majority of records stems from the southern area of the park around the well collected sites at Park Headquarters and

Poring Hot Springs (Fig. 1), whereas the northern parts of the park remain virtually unexplored with regard to butterflies. Apart from focussing on the lesser collected areas in the park, future studies should also concentrate on ecological observations, particularly of early stages and hostplant relationships (e.g. Fiedler, 1995), in order to try to establish which of the species listed here can be considered as true residents as opposed to strays or regular visitors. Such data will be essential for the planning and evaluation of conservation measures, which hopefully the present list will provide some basis for in the future.

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