

Butterfly Biodiversity in Singapore with Particular Reference to the Central Catchment Nature Reserve

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Abstract

A total of 381 butterfly species have now been recorded in Singapore of which 18 are new records since 1990. Of this total, 236 species (62%) were recorded during the present survey. All except 8 (3%) of these occur within the Nature Reserves and 148 (63%) were recorded only within the Nature Reserves. A total of 74 species (31%) within the Reserves were considered very rare.

Introduction

The study of butterflies by amateurs is not new, and indeed, it is through the observations of these dedicated individuals that much important data have been accumulated over the years. The information on butterfly biodiversity in Singapore is, at most, sketchy. Most of the documentation of the species occurred done during the post-war years until the late 1960s. From our literature research, two references stand out: W.A. Fleming's *Butterflies of West Malaysia and Singapore* (1991) and Steven Corbet and Maurice Pendlebury's *Butterflies of the Malay Peninsula* (1992). Although the latest editions of the two reference books were published in the early 1990s, most of the updates referred only to the Peninsular Malaysia. Collating data from these reference books, the last known total species count for Singapore Island was 363 (Corbet & Pendlebury, 1992).

Only recently has a concerted effort been made to study and establish the status of butterfly biodiversity in Singapore. This paper presents our observations and findings with particular reference to the Central Catchment Nature Reserve. With continued support from the National Parks Board there is an opportunity to undertake a long-term butterfly biodiversity survey in Singapore so that the knowledge of the status of species of butterflies will increase and a greater understanding of these beautiful creatures will be established.

Methods

Field surveys were conducted from 1990 to 1997 in and around various

areas in Singapore. In particular, many of the surveys were concentrated within and around the Central Catchment Nature Reserve. For the surveys, we used a simple method of selecting sites based on available information of known or marked routes. Field surveys were based on visual identification but where necessary, specimens were captured for closer inspection and subsequently released, or were kept in a reference collection. Where possible, the number of individuals was noted, and other observations like male/female or special activities were also documented. However, it should be noted that for two of the families, Lycaenidae and Hesperidae, there are limitations to field identification, and even in a set reference collection, the correct identification of certain species may be difficult. Whilst all attempts have been made to identify the species correctly, it is hoped that the data from future surveys and scientific studies will provide opportunities for counterchecking and confirmation.

Results and Discussion

To establish a reference database on the butterfly biodiversity in Singapore, a comprehensive checklist of the species observed during the last seven years has been compiled (Table 1). Of the 363 species previously known species in Singapore, a total of 218 (or 60%) was accounted for. A further 18 new records were observed, making a total of 236 extant species (Appendix 1). Not all species were located within the Central Catchment Nature Reserves.

Summary Analysis by Family

About 60% of the species previously identified as existing in Singapore can still be found. Many of the larger and showy species are still evident, although some species are extremely rare with only a few individuals observed. The family Papilionidae (Plate 1a-f) is currently represented by 13 species in Singapore. It can be safely concluded that two species, Malayan Birdwing *Troides amphrysus ruficollis* and Great Blue Mime *Chilasa paradoxa aenigma*, recorded earlier have since become extinct. A surprising find is Blue Helen *Papilio prexaspes prexaspes*. It is highly unlikely that the earlier authors missed such a large butterfly. We can only speculate that the species has migrated south from Peninsular Malaysia and has since established a small colony.

The family Pieridae seems to have suffered a significant drop in biodiversity over the years. Only 15 out of the original 23 species still survive in Singapore. However, the *Eurema* species, particularly, Common

Table 1. Survey of Butterfly Biodiversity – Species Count.

Family	Subfamily	Literature Records (A)	Sighted during survey period (B)	% of Original (C)	New Records (D)	Extant no. of species (B + D)	Total recorded for Singapore (A + D)
Papilionidae	Papilioninae	14	12	85.7	1	13	15
Pieridae	Pierinae	11	6	54.5	0	6	11
	Coliadinae	12	9	75.0	0	9	12
Nymphalidae	Danainae	18	13	72.2	0	13	18
	Satyrinae	17	16	94.1	1	17	18
	Morphinae	7	5	71.4	0	5	7
	Nymphalinae	51	37	72.5	4	41	55
	Charaxinae	5	2	40.0	0	2	5
Lycaenidae	Riodininae	6	3	50.0	0	3	6
	Poritiinae	3	2	66.7	0	2	3
	Miletinae	13	6	46.2	0	6	13
	Curetinae	5	2	40.0	0	2	5
	Lycaeninae	132	64	48.5	5	69	137
Hesperiidae	Coeliadinae	10	8	80.0	0	8	10
	Pyrginae	8	6	75.0	3	9	11
	Hesperiinae	51	27	52.9	4	31	55
TOTAL		363	218	58.6	18	236	381

Grass Yellow *Eurema hecabe contubernalis* enjoys the distinction of being the most common butterfly in Singapore and can often be found in abundance.

The family Nymphalidae is represented by 5 subfamilies in Singapore. A total of 13 species of the subfamily Danainae (Plate 2a–b) can still be found in Singapore. Most of these species can often be found swarming around flowering trees, e.g., *Syzygium* spp. (Myrtaceae) in the Nature Reserves. One species, Plain Tiger *Danaus chrysippus chrysippus* (Plate 2b) is decidedly local and can be found only in a few suburban locations. The subfamily Satyrinae (Plate 2c, d) records a healthy 94% of the original species known to exist in Singapore. Furthermore, one new record *Mycalesis perseoides perseoides* has been added to the Singapore checklist. Of notable interest is *Elymnias penanga penanga*, which still survives but only on Pulau Ubin. Most of the species in this subfamily feed on grasses,

bamboo, palms and other monocotyledons. Five of the original seven of the subfamily Morphinae still exist in Singapore, although most are forest butterflies that have become quite rare. As many of the species are attracted to fruit bait, it would be interesting to conduct bait trap experiments to establish the density of these species. Dark Blue Jungle Glory *Thaumantis klugius lucipor* is one of the most beautiful butterflies in the region, comparable to the *Morpho* of South America. The life history of the species is still unknown, although we suspect that it feeds on rattan or another palm. The subfamily Nymphalinae (Plate 3a–c) records a total of 37 of the original 51 species that existed in Singapore. The majority of the species can be found in the nature reserves. It is interesting to note that we have observed four new records, Lace Sergeant *Athyma pravara helma*, Plain Lacewing *Cethosia penthesilia methypsea*, *Neptis harita harita* and *Lexias dirtea merguia* (Plate 3c) for Singapore. One species, *Neptis harita harita* is restricted in distribution, and can only be found in the Mandai area. It is likely that this species migrated from Malaysia in recent years and the colony in Singapore is highly dependent on a hitherto unknown food plant somewhere in the northern part of Singapore. Only two of the original five species of the subfamily Charaxinae (Plate 3d) have been observed in Singapore recently. Both species are rather rare and are not often seen. Although the Blue Nawab *Polyura schreiber tisamenus*, is known to feed on leaves of the common rambutan, it has become extremely rare, as the food plant has seen a significant loss in popularity as a garden fruit tree in recent years, and also there have been severe changes in its favoured habitat.

The family Lycaenidae (Plates 4a–d, 5a–c) includes the largest number of species in both Malaysia and Singapore. Of the originally recorded 159 species, we have observed only 77 to date. However, many of the species in this family are difficult to identify with certainty, particularly in the genera *Arhopala*, *Jamides*, *Allotinus* and *Nacaduba*. Further intensive research and field collection would probably yield a greater number of species that have not been recorded in recent years.

Finally, the family Hesperidae (Plate 5d–e), with 41 of the original 69 species found in Singapore, may also yield more species when more collecting data are available. It is interesting to note that we have discovered a total of seven new records for Singapore – the highest number of new records amongst the five butterfly families in Singapore.

Some Observations on Singapore Butterflies and Their Host Plants

The interrelation between butterflies and their caterpillar host plants cannot

be understated. Many species depend solely on one particular species of plant and will obviously become extinct, if the host plant is no longer available.

Interestingly, the adaptation of certain species is remarkable, in that due to some evolutionary process, these species have been found to feed on other plants. One such case is the species Common Faun *Faunis canens arcesilas*. From established literature (Corbet & Pendlebury, 1992), this species was reported to feed on a species of wild banana (*Musa sp.*). However, we have discovered that the species in Singapore feeds on Fish Tail Palm (*Caryota mitis*, Arecaceae).

Another species, The Common Tit *Hypolycaena erylus teatus* (Plate 5c), was known to feed on *Vangueria spinosa* (Rubiaceae) and *Cinnamomum verum* (Lauraceae), (Corbet & Pendlebury, 1992). However, we made a startling find here in Singapore, when we discovered the caterpillars of this species, feeding on Javanese Ixora (*Ixora javanica*, Rubiaceae), planted at the road shoulder along busy Victoria Street in downtown Singapore!

Eurema species, on the other hand, have been found on several types of Leguminosae such as *Cassia*, *Acacia*, *Caesalpinia* and *Albizia*. The species' versatility in their host plants seem to explain why they are often abundant in many areas in Singapore. It is interesting to note that the species Common Grass Yellow *Eurema hecabe contubernalis*, does not seem to have any preference for large- or small-leaved plants. We have seen a female of the species lay her eggs on both Peacock Flower (*Caesalpinia pulcherrima*, Leguminosae) and Seven Golden Candlesticks (*Cassia alata*, Leguminosae) planted in adjacent pots. The caterpillars were bred to adulthood with no apparent difference or distinction in size or colouration.

Orange Emigrant *Catopsilia scylla scylla* appears to be confined to urban areas where its host plant, *Cassia biflora*, is grown as a roadside tree. It is not unusual to find the butterfly, which is fast on the wing, darting between the rush hour traffic along Shenton Way. We have not encountered this species in the Nature Reserves.

Some Observations on Habitats and Feeding Preferences of Singapore Butterflies

Many butterflies species that we recorded during the surveys were observed whilst feeding. Favourite flowering bushes of many species of butterflies are Prickly Lantana (*Lantana camara*, Verbenaceae), Singapore Rhododendron (*Melastoma malabathricum*, Melastomataceae), Common

Asystasia (*Asystasia gangetica* spp. *micrantha*, Acanthaceae), Mile-a-Minute (*Mikania micrantha*, Compositae) and Common Snakeweed (*Stachytarpheta indica*, Verbenaceae). Occasionally, we encountered a flowering tree in the Nature Reserves, which was literally swarmed with butterflies. Some of the *Syzygium* species when in full bloom are particularly attractive to butterflies. Species of the families Papilionidae, Pieridae and Nymphalidae are attracted to roadside seepages and damp muddy banks where they imbibe the liquid nutrients from the ground.

Many species are also attracted to rotting fruit like pineapple, papaya and banana and certain species of butterflies feed on rotting fruits of figs (*Ficus* spp.) on the forest floor. Of particular interest is the Dark Blue Jungle Glory *Thaumantis klugius lucipor*, one of the most beautiful species of the Morphinae subfamily, which is reported to avoid fruit bait (Corbet & Pendlebury, 1992). However, we have observed an individual female of this species feeding on the rotting berries on the forest floor. This suggests that it can be captured with a bait trap, provided that its preferred menu is offered.

Several species of the subfamily Danaïnae are attracted to dried plants of Indian Heliotrope (*Heliotropium indicum*, Boraginaceae).

Conclusions

Although the biodiversity of butterflies in Singapore may be considered fair, a number of species observed were represented by only a single specimen. There is cause for more effort on the conservation of remaining nature reserves in Singapore to maintain what is left of the flora on which the butterflies depend on for survival. As studies on identifying the host plants for the different species of butterflies is far from complete, it is necessary to conserve as much plant biodiversity in the Nature Reserves as possible.

For the known host plants, it would be useful to identify possible locations where these species may be planted without danger of being sprayed with pesticides and other chemicals that are harmful to the caterpillars and egg-laying females. Whilst the Nature Reserves would be the obvious choice for establishing these plants, urban and suburban areas may also be considered. Some examples of roadside trees e.g., *Cassia fistula*, *Cassia biflora*, *Cerbera odollam* (Apocynaceae) and others are already supporting certain species in the public housing areas. "Butterfly gardens" could be incorporated into school ecogardens, government-owned premises such as bin centres, power substations and other utility buildings – where the plants could be cultivated and left to be eaten by the caterpillars without

too much concern for the aesthetic appearance of the plants themselves. Even a small area of the Singapore Botanical Gardens could be set aside to cultivate insecticide-free host plants.

If the cultivation of host plants is more widespread, there will also need to be adequate flowering plants to support the adult butterflies. In this case, there is less concern about where these flowering plants could be grown. In fact, our parks and green areas are ideal for planting *Ixora*, *Lantana camara*, and other nectar-rich flowering plants that the adult butterflies depend on for sustenance.

There is also scope for a pilot study on the re-introduction of some of the more spectacular species of butterflies that have become extinct in Singapore. For example, we could import the pupae of the "birdwing" species Malayan Birdwing *Troides amphrysus ruficollis* and release the adult butterflies in areas where its food plant Dutchman's Pipe *Aristolochia tagala*, is cultivated and monitor the survival rate of the species. As the host plant is indigenous, it does no threat to Singapore's flora. However, care must be taken to ensure that the re-introduction will not be at the expense of existing species of butterflies which share the same host plant.

There is still much to learn and do, and we hope that this paper will help in a small way to increase the knowledge of our butterflies and to help preserve them for Singapore's future generations.

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Appendix 1. Checklist of Butterflies in Singapore.

Legend for Status

Very Rare - An average of 1–5 individuals observed per year

Rare - An average of 6–20 individuals observed per year

Common - An average of 21–50 individuals observed per year

Very Common - An average of 51 or more individuals observed per year

Legend for Habitat

1. Not present in the Nature Reserves

2. Present in the Reserves and other Locations Outside the Nature Reserves

3. Present Only in the Nature Reserves

4. Largely Confined to the Reserves with an Occasional Record Outside the Nature Reserves

No.	Species	Common Name	Status	Habitat
Family PAPILIONIDAE — Subfamily PAPILIONINAE				
1.	<i>Chilasa clytia clytia</i>	Common Mime	Rare	2
2.	<i>Graphium agamemnon agamemnon</i>	Tailed Green Jay	Common	2
3.	<i>Graphium evemon eventus</i>	-	Very Common	4
4.	<i>Graphium sarpedon luctatius</i>	Common Bluebottle	Very Common	4
5.	<i>Pachliopta aristolochiae asteris</i>	Common Rose	Rare	2
6.	<i>Papilio demoleus malayanus</i>	Lime Butterfly	Very Common	2
7.	<i>Papilio demolion demolion</i>	Banded Swallowtail	Rare	2
8.	<i>Papilio iswara iswara</i>	Great Helen	Rare	3
9.	<i>Papilio memnon agenor</i>	Great Mormon	Common	2
10.	<i>Papilio polytes romulus</i>	Common Mormon	Very Common	2
11.	<i>Papilio prexaspes prexaspes</i>	Blue Helen	Very Rare	3
12.	<i>Pathysa antiphates itamputi</i>	Five Bar Swordtail	Rare	3
13.	<i>Troides helena cerberus</i>	Common Birdwing	Rare	2
	<i>Chilasa paradoxa aenigma</i>	Great Blue Mime	Extinct	
	<i>Troides amphrysus ruficollis</i>	Malayan Birdwing	Extinct	
Family PIERIDAE — Subfamily PIERINAE				
14.	<i>Appias libythea olferna</i>	Striped Albatross	Very Common	2
15.	<i>Appias lyncida vasava</i> ^{*1}	Chocolate Albatross	Very Rare	2
16.	<i>Delias hyparete metarete</i>	Painted Jezebel	Very Common	2
17.	<i>Delias pasithoe parthenope</i> ^{*2}	-	Very Rare	1
18.	<i>Leptosia nina malayana</i>	Psyche	Rare	2
19.	<i>Pieris canidia malayica</i>	Cabbage White	Common	1
	<i>Appias nero figulna</i>	Orange Albatross	Extinct	
	<i>Cepora iudith malaya</i>	Orange Gull	Extinct	
	<i>Delias singhapura singhapura</i>	-	Extinct	
	<i>Pareronia valeria lutescens</i>	Wanderer	Extinct	
	<i>Saletara liberia distant</i>	Malayan Albatross	Extinct	

No.	Species	Common Name	Status	Habitat
Family PIERIDAE — Subfamily COLIADINAE				
20.	<i>Catopsilia pomona pomona</i>	Common Emigrant	Very Common	2
21.	<i>Catopsilia pyranthe pyranthe</i>	Mottled Emigrant	Rare	2
22.	<i>Catopsilia scylla scylla</i>	Orange Emigrant	Common	1
23.	<i>Eurema andersonii andersonii</i>	-	Rare	3
24.	<i>Eurema blanda snelleni</i>	Three Spot Grass Yellow	Very Common	2
25.	<i>Eurema hecabe contubernalis</i>	Common Grass Yellow	Very Common	2
26.	<i>Eurema sari sodalis</i>	Chocolate Grass Yellow	Very Common	2
27.	<i>Eurema simulatrix tecmessa</i>	-	Very Common	2
28.	<i>Gandaca harina distanti</i>	Tree Yellow	Common	3
	<i>Dercas verhuelli herodorus</i>	-	Extinct	
	<i>Eurema ada iona</i>	-	Extinct	
	<i>Eurema brigitta senna</i>	-	Extinct	
Family NYMPHALIDAE — Subfamily DANAINAE				
29.	<i>Danaus chrysippus chrysippus</i> ^{*3}	Plain Tiger	Very Rare	2
30.	<i>Danaus genutia genutia</i>	Common Tiger	Common	2
31.	<i>Danaus melanippus hegesippus</i>	Black Veined Tiger	Rare	2
32.	<i>Euploea camaralzeman malayica</i> ^{*4}	Malayan Crow	Very Rare	3
33.	<i>Euploea crameri bremeri</i>	Spotted Black Crow	Rare	4
34.	<i>Euploea eyndhovii gardineri</i>	Striped Black Crow	Rare	3
35.	<i>Euploea midamus singapura</i>	Spotted Blue Crow	Rare	4
36.	<i>Euploea mulciber mulciber</i>	Striped Blue Crow	Common	2
37.	<i>Euploea phaenareta castelnaui</i>	King Crow	Common	2
38.	<i>Euploea radamanthus radamanthus</i>	Magpie Crow	Common	4
39.	<i>Idea stollis logani</i>	Common Tree Nymph	Common	3
40.	<i>Ideopsis vulgaris macrina</i>	Blue Glassy Tiger	Very Common	2
41.	<i>Parantica agleoides agleoides</i>	Dark Glassy Tiger	Very Common	2
	<i>Euploea eunice lencogonis</i>	Blue Branded King Crow	Common	3
	<i>Euploea tulliolus ledereri</i>	Dwarf Crow	Extinct	
	<i>Idea leuconoe chersonesia</i>	White Tree Nymph	Extinct	
	<i>Ideopsis gaura perakana</i>	Lesser WoodNymph	Extinct	
	<i>Parantica aspasia aspasia</i>	Yellow Glassy Tiger	Extinct	
Family NYMPHALIDAE — Subfamily SATYRINAE				
42.	<i>Elymnias hypermnestra agina</i>	Common Palmfly	Very Common	2
43.	<i>Elymnias panthera panthera</i>	Tawny Palmfly	Rare	3
44.	<i>Elymnias penanga penanga</i> ^{*5}	-	Very Rare	1
45.	<i>Lethe europa malaya</i>	Bamboo Tree Brown	Very Rare	3
46.	<i>Melanitis leda leda</i>	Common Evening Brown	Rare	2

No.	Species	Common Name	Status	Habitat
47.	<i>Mycalesis fusca fusca</i>	Malayan Bush Brown	Rare	3
48.	<i>Mycalesis mineus macromalayana</i>	Dark Brand Bush Brown	Very Common	2
49.	<i>Mycalesis orseis nautilus</i>	Purple Bush Brown	Rare	3
50.	<i>Mycalesis perseoides perseoides</i>	-	Rare	2
51.	<i>Mycalesis perseus cepheus</i>	-	Common	2
52.	<i>Mycalesis visala phamis</i>	-	Rare	3
53.	<i>Orsotriaena medus cinerea</i>	Nigger	Very Common	2
54.	<i>Ypthima baldus newboldi</i>	Common Five Ring	Common	2
55.	<i>Ypthima fasciata torone</i> * ⁶	-	Very Rare	3
56.	<i>Ypthima horsfieldi humei</i> * ⁷	-	Very Rare	3
57.	<i>Ypthima huebneri</i>	Common Four Ring	Very Common	4
58.	<i>Ypthima pandocus corticaria</i>	Common Three Ring	Very Common	2
	<i>Elymnias esaca esaca</i>	-	Extinct	
Family NYMPHALIDAE — Subfamily MORPHINAE				
59.	<i>Amathusia phidippus phidippus</i>	Palm King	Rare	4
60.	<i>Discophora sondaica despoliata</i> * ⁸	-	Very Rare	3
61.	<i>Faunis canens arcesilas</i>	Common Faun	Common	3
62.	<i>Thaumantis klugius lucipor</i>	Dark Blue Jungle Glory	Very Rare	3
63.	<i>Zeuxidia amethystus amethystus</i>	Saturn	Common	3
	<i>Thaumantis noureddin noureddin</i>	Dark Jungle Glory	Extinct	
	<i>Zeuxidia doubledayi doubledayi</i>	-	Extinct	
Family NYMPHALIDAE — Subfamily NYMPHALINAE				
64.	<i>Athyma asura idita</i>	-	Very Rare	3
65.	<i>Athyma kanwa kanwa</i>	-	Very Rare	3
66.	<i>Athyma nefte subrata</i>	Colour Sergeant	Rare	3
67.	<i>Athyma pravara helma</i>	Lance Sergeant	Very Rare	3
68.	<i>Athyma reta moorei</i>	-	Very Rare	3
69.	<i>Cethosia hypsea hypsina</i>	Malay Lacewing	Very Common	4
70.	<i>Cethosia penthesilia methypsea</i> * ⁹	Plain Lacewing	Very Rare	2
71.	<i>Chersonesia peraka peraka</i> * ¹⁰	-	Very Rare	3
72.	<i>Cirrochroa orissa orissa</i>	Banded Yeoman	Very Rare	3
73.	<i>Cupha erymanthis lotis</i>	Rustic	Rare	3
74.	<i>Eulaceura osteria kumana</i>	-	Very Common	3
75.	<i>Euripus nyctelius euploeoides</i>	Courtesan	Rare	3
76.	<i>Euthalia aconthea gurda</i>	Baron	Very Rare	2
77.	<i>Euthalia adonia pinwilli</i>	-	Very Rare	3
78.	<i>Euthalia monina monina</i>	Malay Baron	Common	3
79.	<i>Hypolimnas anomala anomala</i>	Malayan Eggfly	Very Common	2
80.	<i>Hypolimnas bolina bolina</i>	Great Eggfly	Very Common	4
81.	<i>Hypolimnas misippus misippus</i> * ¹¹	-	Very Rare	3

No.	Species	Common Name	Status	Habitat
82.	<i>Junonia almana javana</i>	Peacock Pansy	Rare	2
83.	<i>Junonia atlites atlites</i>	Grey Pansy	Rare	2
84.	<i>Junonia hedonia ida</i>	Chocolate Pansy	Very Common	2
85.	<i>Junonia orithya wallacei</i>	Blue Pansy	Common	2
86.	<i>Lasippa heliodore dorelia</i>	-	Rare	3
87.	<i>Lasippa tiga siaka</i>	Burmese Lascar	Common	3
88.	<i>Lebadea martha parkeri</i>	Knight	Rare	4
89.	<i>Lexias canescens pardalina</i>	-	Very Rare	3
90.	<i>Lexias dirtea merguia</i>	-	Rare	3
91.	<i>Lexias pardalis dirteana</i>	Archduke	Very Common	3
92.	<i>Moduza procris milonia</i>	Commander	Very Common	3
93.	<i>Neptis harita harita</i> * ¹²	-	Rare	3
94.	<i>Neptis hylas papaja</i>	Common Sailor	Rare	4
95.	<i>Neptis leucoporus cresina</i>	-	Very Common	3
96.	<i>Pandita sinope sinope</i>	-	Rare	3
97.	<i>Pantoporia hordonia</i>	Common Lascar	Rare	3
98.	<i>Pantoporia paraka paraka</i>	-	Rare	3
99.	<i>Phaedyma columella singa</i>	Short Banded Sailor	Common	2
100.	<i>Phalantha phalantha phalantha</i>	Leopard	Common	2
101.	<i>Tanaecia iapis puseda</i>	Horsfield's Baron	Common	3
102.	<i>Tanaecia pelea pelea</i>	Malay Viscount	Very Common	4
103.	<i>Terinos terpander robertsia</i>	Royal Assyrian	Rare	3
104.	<i>Vindula dejone erotella</i>	Cruiser	Very Common	3
	<i>Ariadne ariadne ariadne</i>	Angled Castor	Extinct	
	<i>Athyma perius perius</i>	Common Sergeant	Extinct	
	<i>Bassarona teuta goodrichi</i>	Banded Marquis	Extinct	
	<i>Chersonesia rahria rahria</i>	Wavy Maplet	Extinct	
	<i>Dophla evelina compta</i>	-	Extinct	
	<i>Euthalia djata rubidifascia</i>	-	Extinct	
	<i>Euthalia merta merta</i>	-	Extinct	
	<i>Neptis miah batara</i>	-	Extinct	
	<i>Pantoporia aurelia aurelia</i>	-	Extinct	
	<i>Pantoporia dindinga</i>	-	Extinct	
	<i>Pantoporia sandaka sandaka</i>	-	Extinct	
	<i>Parthenos sylvia lilacinus</i>	Clipper	Extinct	
	<i>Tanaecia godartii puloa</i>	Malay Count	Extinct	
	<i>Vagrans egista macromalayana</i>	Vagrant	Extinct	

Family **NYMPHALIDAE** — Subfamily **CHARAXINAE**

105.	<i>Polyura hebe plautus</i>	-	Rare	3
106.	<i>Polyura schreiber tisamenus</i>	Blue Nawab	Very Rare	3
	<i>Charaxes bernadus crepax</i>	Tawny Rajah	Extinct	
	<i>Polyura moori moori</i>	-	Extinct	
	<i>Prothoe franck uniformis</i>	-	Extinct	

Family **LYCAENIDAE** — Subfamily **RIODININAE**

107.	<i>Abisara geza niya</i>	-	Rare	3
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No.	Species	Common Name	Status	Habitat
108.	<i>Abisara savitri savitri</i>	-	Rare	3
109.	<i>Laxita thuisto thuisto</i>	Lesser Harlequin	Rare	3
	<i>Abisara saturata kausambioides</i>	Malayan Plum Judy	Extinct	
	<i>Taxila haquinus haquinus</i>	Harlequin	Extinct	
	<i>Zemeros flegyas albipunctatus</i>	Punchinello	Extinct	
Family LYCAENIDAE — Subfamily PORITIINAE				
110.	<i>Poritia philota philota</i>	-	Very Rare	3
111.	<i>Poritia sumatrae sumatrae</i>	Sumatran Gem	Rare	3
	<i>Simiskina phalia potina</i>	Blue Brilliant	Extinct	
Family LYCAENIDAE — Subfamily MILETINAE				
112.	<i>Allotinus unicolor unicolor</i>	Lesser Darkie	Rare	3
113.	<i>Logania marmorata damis</i>	-	Rare	3
114.	<i>Miletus biggsii biggsii</i>	Bigg's Brownie	Common	2
115.	<i>Miletus gopara gopara</i>	-	Rare	3
116.	<i>Miletus symethus petronius</i> * ¹³	-	Rare	3
117.	<i>Spalgis epius epius</i>	-	Very Rare	2
	<i>Allotinus davidis</i>	-	Extinct	
	<i>Allotinus horsfieldi nessus</i>	-	Extinct	
	<i>Allotinus strigatus malayanus</i>	-	Extinct	
	<i>Allotinus substrigosus substrigosus</i>	-	Extinct	
	<i>Allotinus subviolaceus alkamah</i>	-	Extinct	
	<i>Liphyra brassolis abbreviata</i>	The Moth Butterfly	Extinct	
	<i>Miletus gaesa gaesa</i>	-	Extinct	
Family LYCAENIDAE — Subfamily CURETINAE				
118.	<i>Curetis santana malayica</i>	Malayan Sunbeam	Common	2
119.	<i>Curetis saronis sumatrana</i> * ¹⁴	-	Very Rare	1
	<i>Curetis bulis stigmata</i>	-	Extinct	
	<i>Curetis regula</i>	-	Extinct	
	<i>Curetis sperthis sperthis</i>	-	Extinct	
Family LYCAENIDAE — Subfamily LYCAENINAE				
120.	<i>Acytolepis puspa lambi</i>	Common Hedge Blue	Common	3
121.	<i>Anthene emolus goberus</i>	Ciliate Blue	Rare	4
122.	<i>Anthene lycaenina miya</i>	-	Rare	4
123.	<i>Arhopala abseus abseus</i>	-	Rare	3
124.	<i>Arhopala aedias agnis</i>	Large Metallic Oak Blue	Rare	4
125.	<i>Arhopala ammon ammon</i>	-	Very Rare	3
126.	<i>Arhopala amphimuta amphimuta</i>	-	Very Rare	3
127.	<i>Arhopala antimuta antimuta</i>	-	Rare	3
128.	<i>Arhopala athada athada</i>	-	Rare	3
129.	<i>Arhopala atosia malayana</i>	Tailed Disc Oak Blue	Very Rare	3

No.	Species	Common Name	Status	Habitat
130.	<i>Arhopala aurea</i>	-	Rare	3
131.	<i>Arhopala epimuta epiala</i>	-	Rare	3
132.	<i>Arhopala major major</i>	-	Rare	3
133.	<i>Arhopala myrzala lammas</i>	-	Very Rare	3
134.	<i>Arhopala pseudocentaurus nakula</i>	-	Rare	2
135.	<i>Arhopala pseudomuta pseudomuta</i>	Raffles' Oak Blue	Rare	3
136.	<i>Arhopala trogon</i> * ¹⁵	-	Very Rare	3
137.	<i>Caleta elna elvira</i>	Elbowed Pierrot	Rare	3
138.	<i>Castalius rosimon rosimon</i> * ¹⁶	-	Very Rare	3
139.	<i>Catochrysops panormus exiguus</i>*¹⁷	Silver Forget-Me-Not	Very Rare	1
140.	<i>Catochrysops strabo strabo</i>	-	Very Rare	3
141.	<i>Cheritra freja friggia</i>	Common Imperial	Very Rare	3
142.	<i>Chilades pandava pandava</i>	Cycad Blue	Common	2
143.	<i>Deudorix epijarbas cinnabarus</i>	Cornelian	Rare	3
144.	<i>Drupadia ravindra moorei</i>	Common Posy	Common	3
145.	<i>Drupadia rufotaenia rufotaenia</i> * ¹⁸	-	Very Rare	3
146.	<i>Drupadia theda thesmia</i>	Dark Posy	Very Rare	3
147.	<i>Eooxylides tharis distanti</i>	Branded Imperial	Very Common	3
148.	<i>Euchrypsos cnejus cnejus</i>	Gram Blue	Common	3
149.	<i>Everes lacturnus rileyi</i>	Indian Cupid	Very Rare	1
150.	<i>Flos anniella anniella</i>	-	Very Rare	3
151.	<i>Flos apidanus saturatus</i>	-	Rare	3
152.	<i>Flos diardi capeta</i>	-	Rare	3
153.	<i>Flos fulgida singhapura</i>	-	Rare	3
154.	<i>Horaga syrinx maenala</i> * ¹⁹	-	Very Rare	4
155.	<i>Hypolycaena erylus teatus</i>	Common Tit	Common	4
156.	<i>Hypolycaena thecloides thecloides</i>	-	Very Rare	4
157.	<i>Ionolyce helicon merguiana</i>	Pointed Line Blue	Common	3
158.	<i>Iraota distanti distanti</i>*²⁰	-	Very Rare	3
159.	<i>Iraota rochana boswelliana</i>	-	Very Rare	4
160.	<i>Jacoona anasuja anasuja</i> * ²¹	-	Very Rare	3
161.	<i>Jamides bochus nabonassar</i> * ²²	-	Very Rare	3
162.	<i>Jamides caeruleus caeruleus</i>	Sky Blue	Rare	3
163.	<i>Jamides celeno aelianus</i>	Common Caerulean	Common	4
164.	<i>Lampides boeticus</i>	Pea Blue	Rare	3
165.	<i>Loxura atymnus fuconius</i>	Yamfly	Rare	3
166.	<i>Megisba malaya sikkima</i>	-	Very Rare	3
167.	<i>Nacaduba berenice icena</i>	Rounded 6-Line Blue	Rare	3
168.	<i>Nacaduba beroe neon</i>	-	Rare	3
169.	<i>Neocheritra amrita amrita</i>	Grand Imperial	Very Rare	3
170.	<i>Neopithecops zalmora zalmora</i>	-	Very Rare	3
171.	<i>Prosotas nora superdates</i>	-	Common	4
172.	<i>Rapala dienece dienece</i> * ²³	-	Very Rare	3
173.	<i>Rapala domitia domitia</i>	-	Rare	3
174.	<i>Rapala iarbus iarbus</i>	Common Red Flash	Rare	3

No.	Species	Common Name	Status	Habitat
175.	<i>Rapala manea chozeba</i>	-	Very Rare	3
176.	<i>Rapala suffusa barthema</i>	-	Very Rare	3
177.	<i>Rapala varuna orseis</i>	-	Rare	3
178.	<i>Remelana jangala travana</i> *24	Chocolate Royal	Very Rare	3
179.	<i>Semanga superba deliciosa</i>	-	Rare	3
180.	<i>Sinthusia nakasa amba</i>	-	Rare	3
181.	<i>Spindasis lohita senama</i>	Long Banded Silverline	Very Rare	3
182.	<i>Spindasis syama terana</i>	Club/Black-Banded Silverline	Very Rare	3
183.	<i>Surendra vivarna amisena</i>	Acacia Blue	Rare	3
184.	<i>Tajuria cippus maxentius</i>	Peacock Royal	Rare	4
185.	<i>Virachola kessuma deliochus</i> *25	-	Very Rare	3
186.	<i>Zeltus amasa maximinianus</i>	Fluffy Tit	Rare	3
187.	<i>Zizina otis lampa</i>	Lesser Grass Blue	Very Common	2
188.	<i>Zizula hylax pygmaea</i>	-	Rare	1
	<i>Ancema blanka blanka</i>	-	Extinct	
	<i>Arhopala achelous achelous</i>	-	Extinct	
	<i>Arhopala agrata agrata</i>	de Niceville's Dull Oakblue	Extinct	
	<i>Arhopala alitaeus pardenas</i>	-	Extinct	
	<i>Arhopala allata pandora</i>	-	Extinct	
	<i>Arhopala ariel</i>	-	Extinct	
	<i>Arhopala avathina avathina</i>	-	Extinct	
	<i>Arhopala barami penanga</i>	-	Extinct	
	<i>Arhopala corinda acestes</i>	-	Extinct	
	<i>Arhopala delta</i>	-	Extinct	
	<i>Arhopala democritus lycaenaria</i>	-	Extinct	
	<i>Arhopala eumolphus maxwelli</i>	Green Oakblue	Extinct	
	<i>Arhopala fulla intaca</i>	-	Extinct	
	<i>Arhopala hypomuta hypomuta</i>	-	Extinct	
	<i>Arhopala inornata inornata</i>	-	Extinct	
	<i>Arhopala lurida</i>	-	Extinct	
	<i>Arhopala metamuta metamuta</i>	-	Extinct	
	<i>Arhopala milleri</i>	-	Extinct	
	<i>Arhopala moorei busa</i>	-	Extinct	
	<i>Arhopala muta maranda</i>	-	Extinct	
	<i>Arhopala normani</i>	-	Extinct	
	<i>Arhopala phanda phanda</i>	-	Extinct	
	<i>Arhopala silhetensis adorea</i>	-	Extinct	
	<i>Arhopala sublustris ridleyi</i>	-	Extinct	
	<i>Arhopala wildeyana wildeyana</i>	-	Extinct	
	<i>Bindahara phocides phocides</i>	-	Extinct	
	<i>Bullis buto cowani</i>	-	Extinct	
	<i>Catapaecilma major emas</i>	-	Extinct	
	<i>Deudorix elioti</i>	-	Extinct	
	<i>Deudorix staudingeri</i>	-	Extinct	

No.	Species	Common Name	Status	Habitat
	<i>Drina cowani</i>	-	Extinct	
	<i>Eliotia jalindra burbona</i>	-	Extinct	
	<i>Horaga albimacula malaya</i>	-	Extinct	
	<i>Horaga chalcedonyx malaya</i>	-	Extinct	
	<i>Horaga onyx sardonyx</i>	-	Extinct	
	<i>Iraota timoleon wickii</i>	-	Extinct	
	<i>Jamides abdul abdul</i>	-	Extinct	
	<i>Jamides alecto ageladas</i>	-	Extinct	
	<i>Jamides elpis pseudelpis</i>	-	Extinct	
	<i>Jamides philatus subditus</i>	-	Extinct	
	<i>Jamides pura pura</i>	-	Extinct	
	<i>Manto hypoleuca terana</i>	-	Extinct	
	<i>Mantoides gama gama</i>	-	Extinct	
	<i>Nacaduba augusta kerriana</i>	-	Extinct	
	<i>Nacaduba calauria malayica</i>	-	Extinct	
	<i>Nacaduba hermus swatipa</i>	-	Extinct	
	<i>Nacaduba kurava nemana</i>	-	Extinct	
	<i>Nacaduba pactolus odon</i>	-	Extinct	
	<i>Nacaduba pavana singapura</i>	-	Extinct	
	<i>Nacaduba pendleburyi pendleburyi</i>	-	Extinct	
	<i>Nacaduba russelli</i>	-	Extinct	
	<i>Nacaduba sanaya elioti</i>	-	Extinct	
	<i>Nacaduba subperusia lysa</i>	-	Extinct	
	<i>Pratapa deva relata</i>	White Royal	Extinct	
	<i>Pratapa icetoides calculis</i>	-	Extinct	
	<i>Prosotas dubiosa lumpura</i>	-	Extinct	
	<i>Pseudotajuria donatana donatana</i>	-	Extinct	
	<i>Purlisa gigantea gigantea</i>	-	Extinct	
	<i>Rapala abnormis abnormis</i>	-	Extinct	
	<i>Rapala cowani</i>	-	Extinct	
	<i>Rapala damona</i>	-	Extinct	
	<i>Rapala pheretima sequeira</i>	-	Extinct	
	<i>Tajuria deudorix ingeni</i>	-	Extinct	
	<i>Tajuria dominus dominus</i>	-	Extinct	
	<i>Tajuria mantra mantra</i>	-	Extinct	
	<i>Una usta usta</i>	Singleton	Extinct	
	<i>Virachola subguttata malaya</i>	-	Extinct	
	<i>Zizeeria karsandra</i>	Dark Grass Blue	Extinct	

Family **HESPERIIDAE** — Subfamily **COELIADINAE**

189.	<i>Badamia exclamationis</i>	-	Very Rare	3
190.	<i>Bibasis etelka</i> * ²⁶	-	Very Rare	3
191.	<i>Bibasis harisa consobrina</i>	Orange Awlet	Very Rare	3
192.	<i>Hasora badra badra</i>	Common Awl	Rare	3
193.	<i>Hasora chromus chromus</i>	-	Very Rare	3
194.	<i>Hasora schoenherr chuza</i> * ²⁷	Yellow Banded Awl	Very Rare	3
195.	<i>Hasora taminatus malayana</i>	-	Rare	2

No.	Species	Common Name	Status	Habitat
196.	<i>Hasora vitta vitta</i>	Plain Banded Awl	Rare	3
	<i>Choaspes subcaudatus crawfurdi</i>	-	Extinct	
	<i>Hasora lizetta</i>	-	Extinct	
Family HESPERIIDAE — Subfamily PYRGINAE				
197.	<i>Gerosis limax dirae</i> * ²⁸	-	Very Rare	3
198.	<i>Gerosis phisara phisara</i> * ²⁹	-	Very Rare	3
199.	<i>Odina hieroglyphica ortina</i>	-	Very Rare	3
200.	<i>Odontoptilum angulatum angulatum</i> * ³⁰	-	Very Rare	3
201.	<i>Tagiades calligana</i>	-	Rare	3
202.	<i>Tagiades gana gana</i>	Large Snow Flat	Rare	3
203.	<i>Tagiades japetus atticus</i>	Common Snow Flat	Rare	3
204.	<i>Tagiades ultra</i>	-	Very Rare	3
205.	<i>Tapena thwaitesi bornea</i> * ³¹	-	Very Rare	3
	<i>Celaenorrhinus asmara asmara</i>	-	Extinct	
	<i>Gerosis tristis</i>	-	Extinct	
Family HESPERIIDAE — Subfamily HESPERIINAE				
206.	<i>Ampittia dioscorides camertes</i> * ³²	Bush Hopper	Rare	3
207.	<i>Ancistroides nigrata maura</i>	Chocolate Demon	Rare	3
208.	<i>Caltoris cormasa</i>	-	Rare	3
209.	<i>Caltoris philippina philippina</i>	-	Common	3
210.	<i>Eetion elia</i>	-	Rare	3
211.	<i>Erionota acroleuca apicalis</i> * ³³	-	Very Rare	3
212.	<i>Erionota thrax thrax</i>	Banana Skipper	Rare	4
213.	<i>Erionota torus</i>	-	Rare	4
214.	<i>Gangara thyrsis thyrsis</i> * ³⁴	Giant Redeye	Very Rare	3
215.	<i>Halpe ormenes vilasina</i>	-	Very Rare	3
216.	<i>Hidari irava</i>	Coconut Skipper	Rare	4
217.	<i>Hyarotis adrastus praba</i>	-	Very Rare	3
218.	<i>Iambrix salsala salsala</i>	Chestnut Bob	Rare	3
219.	<i>Iambrix stellifer</i>	Starry Bob	Very Rare	3
220.	<i>Matapa aria</i>	Common Redeye	Very Rare	3
221.	<i>Notocrypta paralysos varians</i>	Banded Demon	Rare	3
222.	<i>Oriens gola pseudolus</i>	Common Dartlet	Very Rare	3
223.	<i>Pelopidas mathias mathias</i>	Small Branded Swift	Common	4
224.	<i>Plastingia naga</i>	-	Rare	3
225.	<i>Plastingia pellationia</i> * ³⁵	-	Very Rare	3
226.	<i>Polytremis lubricans lubricans</i>	Contiguous Swift	Common	4
227.	<i>Potanthus omaha omaha</i>	Lesser Dart	Common	4
228.	<i>Pyroneura latoia latoia</i>	Yellow Veined Lancer	Common	3
229.	<i>Quedara monteithi monteithi</i> * ³⁶	-	Very Rare	3
230.	<i>Suastus everyx everyx</i> * ³⁷	-	Very Rare	3
231.	<i>Suastus gremius gremius</i>	-	Rare	2
232.	<i>Taractrocera ardonia lamia</i>	-	Very Rare	3
233.	<i>Telicota besta bina</i>	-	Common	4
234.	<i>Udaspes folus</i>	Grass Demon	Rare	2

No.	Species	Common Name	Status	Habitat
235.	<i>Unkana ambasa batara</i>	Hoary Palmer	Very Rare	3
236.	<i>Zela zenon</i> ^{*38}	-	Very Rare	3
	<i>Astictopterus jama jama</i>	Forest Hopper	Extinct	
	<i>Baoris farri farri</i>	-	Extinct	
	<i>Baoris oceia</i>	Paintbrush Swift	Extinct	
	<i>Borbo cinnara</i>	Formosan Swift	Extinct	
	<i>Caltoris malaya</i>	-	Extinct	
	<i>Cephrenes acalle niasicus</i>	-	Extinct	
	<i>Gangara lebadea lebadea</i>	-	Extinct	
	<i>Idmon distanti</i>	-	Extinct	
	<i>Idmon obliquans obliquans</i>	Small Red Bob	Extinct	
	<i>Notocrypta clavata clavata</i>	-	Extinct	
	<i>Parnara bada bada</i>	-	Extinct	
	<i>Pelopidas agna agna</i>	-	Extinct	
	<i>Pemara pugnans pugnans</i>	Pugnacious Lancer	Extinct	
	<i>Potanthus confucius dushta</i>	-	Extinct	
	<i>Potanthus heraerus serina</i>	-	Extinct	
	<i>Potanthus juno juno</i>	-	Extinct	
	<i>Potanthus trachala tytleri</i>	-	Extinct	
	<i>Psolos fuligo fuligo</i>	The Coon	Extinct	
	<i>Telicota augias augias</i>	Palm Dart	Extinct	
	<i>Telicota colon stinga</i>	-	Extinct	
	<i>Zela cowani</i>	-	Extinct	
	<i>Zographetus doxus</i>	-	Extinct	
	<i>Zographetus ogygia ogygia</i>	-	Extinct	
	<i>Zographetus rama</i>	-	Extinct	

Compiled by Khew Sin Khoon, 1 September 1998.

- New records for Singapore are printed in bold.
- Species identified in the genus *Arhopala* are tentative and subject to further verification.
- The extinct species have either not been seen in recent years or are believed to be extinct. However, it is still possible that some of these may turn up in continuing surveys.

¹ Very seasonal. No physical records taken in recent years.

² Record verified by a single physical specimen taken in the Mandai area.

³ Very local in distribution. Found mainly in the Sembawang area.

⁴ Species recorded by a single physical specimen taken at Nee Soon Pipeline.

⁵ Very local in distribution. Observed only on Pulau Ubin.

⁶ Species recorded by a single photographed specimen at Night Safari Zoo.

⁷ Species recorded by a single physical specimen taken in Lower Peirce Reservoir area.

⁸ Species recorded in early 90s. None observed in recent years.

⁹ Not seen in recent years, except for one physical specimen taken on the Gangsa Track, Chestnut Ave.

¹⁰ Two unconfirmed sightings at Upper Seletar Reservoir Park.

¹¹ Not seen in recent years, except one physical specimen taken in the Mandai area.

- ¹² Very localised distribution in the Mandai area.
- ¹³ All specimens taken on the Gangsa Track, Chestnut Ave.
- ¹⁴ Very local in distribution. Records mainly from Sungei Buloh Nature Park.
- ¹⁵ Species recorded from a single physical specimen taken on the Island Club Track.
- ¹⁶ Species recorded from a single physical specimen taken in the MacRitchie area.
- ¹⁷ Species recorded from two physical specimens taken at Pulau Ubin and Khatib Bongsu.
- ¹⁸ Species recorded from a single physical specimen taken on the Island Club Track.
- ¹⁹ Three unconfirmed sightings in Feb 98. No physical specimens taken.
- ²⁰ Species recorded from a single physical specimen taken in the MacRitchie area.
- ²¹ Species recorded from a single physical specimen taken in the Mandai area.
- ²² Species recorded from a single physical specimen taken on the Gangsa Track.
- ²³ Species recorded from a single physical specimen taken on the Gangsa Track.
- ²⁴ Species recorded from a single physical specimen taken in the Upper Seletar Reservoir Park.
- ²⁵ Species recorded from a single physical specimen taken on the Gangsa Track.
- ²⁶ Species recorded from a single physical specimen taken at Nee Soon Pipeline.
- ²⁷ Species recorded from a single physical specimen taken on the Island Club Track.
- ²⁸ Species recorded from a single physical specimen taken on the Island Club Track.
- ²⁹ Species recorded from a single physical specimen taken at Upper Peirce Reservoir.
- ³⁰ Species recorded from a single physical specimen taken at Nee Soon Pipeline.
- ³¹ Species recorded from a single physical specimen taken in the Sime Road area.
- ³² Very local. Found only on the Water's Edge Path, Chestnut Ave area.
- ³³ Species recorded from a single physical specimen taken in the Upper Seletar Reservoir Park.
- ³⁴ Unconfirmed observation on the Island Club Track.
- ³⁵ Species recorded from a single physical specimen taken at Nee Soon Pipeline.
- ³⁶ Species recorded from two physical specimens taken in the Upper Seletar Reservoir Park.
- ³⁷ Species recorded from a single physical specimen taken at Upper Peirce Reservoir.
- ³⁸ Species recorded by a single physical specimen taken in the Upper Seletar Reservoir Park.



Plate 1a Khew Sin Khoon



Plate 1b Khew Sin Khoon



Plate 1c Khew Sin Khoon



Plate 1d Khew Sin Khoon



Plate 1e Khew Sin Khoon



Plate 1f Steven Neo

Plate 1. Family Papilionidae. **a.** The Great Mormon (*Papilio memnon agenor*) female *form-esperti* is the commonest of the four forms found in Singapore. **b.** The Common Mormon (*Papilio polytes romulus*) - recently hatched males drying their wings. **c.** The Banded Swallowtail (*Papilio demolition demolition*) is a threatened species. **d.** The Common Birdwing (*Troides helena cerberus*), being very dependent on its caterpillar host plant, *Aristolochia tagala*, is extremely vulnerable to extinction. **e.** The Five Bar Swordtail (*Pathysa antiphates itamputi*) is a relatively rare and forest-dependent species. **f.** The Tailed Green Jay (*Graphium agamemnon agamemnon*) can be found in the reserves and housing estates.

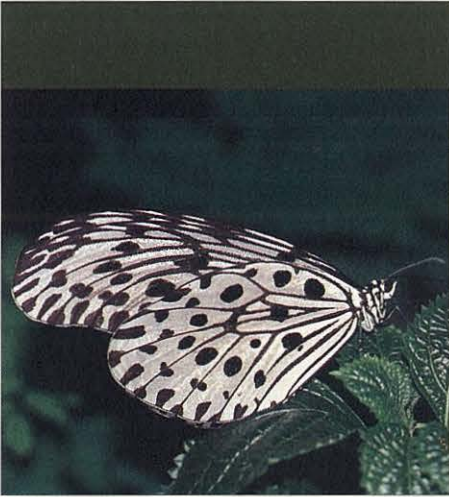


Plate 2a Khew Sin Khoon



Plate 2b Steven Neo



Plate 2c Khew Sin Khoon



Plate 2d Khew Sin Khoon

Plate 2. Family Nymphalidae—Subfamily Danainae (a—b) and Subfamily Satyrinae (c—d).
a. The Common Tree Nymph (*Idea stollii logani*) is a forest-dependent species which floats among tree tops. **b.** The Plain Tiger (*Danaus chrysippus chrysippus*) is extremely rare and sightings are limited to northern part of the island. **c.** The Tawny Palmfly (*Elymnias panthera panthera*) is a forest-dependent species which feeds on palms. **d.** The Malayan Bush Brown (*Mycalesis fusca fusca*) is a forest-dependent species which is usually seen singly amongst low-growing shrubs and grasses.



Plate 3a Khew Sin Khoon



Plate 3b Khew Sin Khoon



Plate 3c Khew Sin Khoon



Plate 3d Khew Sin Khoon

Plate 3. Family Nymphalidae—Subfamily Nymphalinae (a—c) and Subfamily Charaxinae (d). **a.** This rare *Athyma asura idita* is a forest-dependent species. **b.** This extremely rare *Euthalia adonia pinwilli* is most often seen on the western banks of the Upper Peirce Reservoir. **c.** *Lexias dirtea merguia* is a rare forest-dependent species. **d.** *Polyura hebe plautus*, a subspecies thought to occur only in Singapore, and southern Johore.



Plate 4a Steven Neo



Plate 4b Khew Sin Khoon



Plate 4c Khew Sin Khoon

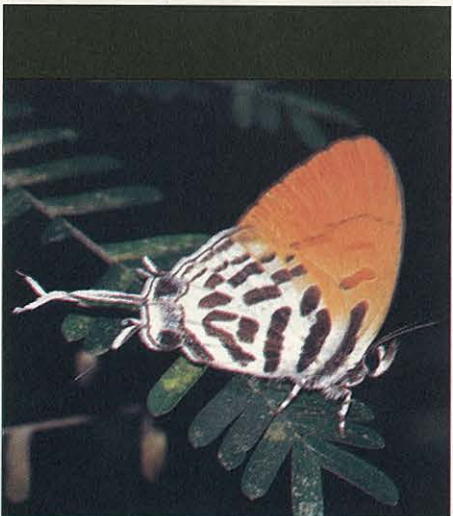


Plate 4d Khew Sin Khoon

Plate 4. Family Lycaenidae—Subfamily Riodininae (a—b) and Subfamily Lycaeninae (c—d). **a.** *Abisara geza niya* is a rare forest-dependent species. **b.** The Lesser Harlequin (*Laxita thuisto thuisto*) is a rare forest-dependent species. **c.** *Arhopala abseus abseus* is more common here than in Malaysia. **d.** The forest-dependent Common Posy (*Drupadia ravindra moorei*) is found throughout the Nature Reserves.



Plate 5a Steven Neo



Plate 5b Steven Neo



Plate 5c Steven Neo



Plate 5d Khew Sin Khoon



Plate 5e Khew Sin Khoon

Plate 5. Family Lycaenidae—Subfamily Lycaeninae (a—c), Family Hesperiidae—Subfamily Pyrginae (d) and Subfamily Coeliadinae (e). **a.** The Common Tit - Caterpillar stage. **b.** The Common Tit - Pupa stage. **c.** The Common Tit (*Hypolycaena erylus teatus*). **d.** *Tagiades calligana* a forest-dependent species which is usually seen singly. **e.** The rare Orange Awlet (*Bibasis harisa consobrina*) is bred on *Arthrophyllum diversifolium* found in the Nature Reserves.