The butterflies of Sulawesi: annotated checklist for a critical island fauna[1]

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All species and subspecies of butterflies recorded from Sulawesi and neighbouring islands (the Sulawesi Region) are listed. Notes are added on their general distribution and hostplants. References are given to key works dealing with particular genera or higher taxa, and to descriptions and illustrations of early stages. As a first step to help with identification, coloured pictures are given of exemplar adults of almost all genera. General information is given on geological and ecological features of the area. Combined with the distributional information in the list and the little phylogenetic information available, endemicity, links with surrounding areas and the evolution of the butterfly fauna are discussed.

Contents

Introduction

This paper presents an annotated checklist of the butterflies (Lepidoptera: Rhopalocera) of the Sulawesi Region (see below), and was originally conceived in connection with the 1985 Royal Entomological Society of London Memorial Expedition *Project Wallace* to Dumoga-Bone National Park, Sulawesi Utara. During this international expedition, which extended over a full year, many members committed their field notes on butterflies to large notebooks. These books, based on an illustrated version of the original draft list that was made to aid field identifications, are deposited in The

[1] Project Wallace Contribution 154.

Natural History Museum, London, and form an as yet largely untapped source of biological information. The information included in the present checklist is based primarily on publications, personal experience and unpublished information received from various colleagues. Museum collections have been checked only in cases of uncertainty of identification, and the distributional information contained in collections has only been used to a limited extent. The following abbreviations have been used: BMNH – The Natural History Museum, London, ZSBS – Zoologische Sammlung des Bayerischen Staates, München; other museums have been printed in full. The main purpose of this checklist is to make the butterfly fauna of Sulawesi more accessible, so that future students can more easily fill in the gaps. We remain hopeful that this work will also form the starting point for production of a much-needed field-guide. Such a guide would give an opportunity to include information from the *Project Wallace* field notes.

Since the work on this checklist started, numerous publications have appeared that directly or indirectly relate to the butterfly fauna of Sulawesi. We have tried to include them all, *but inevitably we will have missed some*. Additions are most welcome. Also, the classification to be adopted has had our special attention. There are widely different classifications in use. For instance, the number of butterfly families recognised ranges from five in Papilionoidea and Hesperioidea together (as in Ackery *et al*., 1999) to fourteen in Papilionoidea only (as in d'Abrera, 2001). Little or no rational explanation can be offered for such inconsistency, other than personal whim. We consider this an undesirable situation. If we do not take ourselves seriously, why should politicians and other decision-makers do so? We are therefore strong supporters of the idea of an authoritative standardized classification (e.g. Vane-Wright, *in press* b) – although we would not agree with all of the proposals made by Godfray (2002). In this checklist we have followed the as yet unpublished higher classification of the Global Butterfly Information System (GloBIS: Lamas *et al.*, 2000). GloBIS will eventually provide an updateable standard list world-wide, to be made available through the internet (Lamas *et al*., in prep.). The current GloBIS higher classification is largely based on Ackery *et al*. (1999), the latest comprehensive publication on the higher classification of butterflies, but also takes into account a number of more recent works (e.g. Brower, 2000; Freitas & Brown, submitted). Vernacular names in English have also been included. These are taken from a variety of sources (e.g. Evans, Corbet & Pendlebury), and a few new ones have been coined (e.g. Jordan's Mormon for *Papilio jordani*, and Bedford-Russell's Idea for *Idea tambusisiana*). Lower case is used for common names applied to whole groups or genera (e.g. awls), but the names are capitalised when they refer to a single species (e.g. Common Awl). Plant names largely follow Robinson *et al.* (2001).

The peculiar fauna of Sulawesi has attracted the attention of many collectors and biogeographers, and continues to do so (e.g. Holloway, 2003). For a better understanding of the distribution and evolution of the fauna, exact knowledge of the distribution of the species, their ecological requirements and phylogenetic relationships, together with the geological history of the region, are all indispensable. We have used available sources to assess the general distribution of the species. It would have been beyond the scope of this paper to give exact localities on the island. We have restricted ourselves to general indications like N, W, etc., as approximate estimations of the known distributions across Sulawesi, and as a means to check whether the various

"arms" (peninsulas) of the island have faunas of their own. Although we have a general idea of the ecological requirements of most species, such as "restricted to understorey of primary forest", "only above 1500 m", or "open shrubs", our knowledge is still too fragmentary to allow a correlation between ecological requirements and distribution. As a first step to a better understanding of ecological requirements we have listed foodplants as far as known at present, and we give (but not exhaustively) literature references to published figures and descriptions of early stages (with these foodplants and early stages usually being based on material from outside Sulawesi; data are thus available for only a few of the endemic species).

Interest in the butterflies of SE Asia has been mainly descriptive: distributional data, faunal surveys, description of early stages and new taxa. These studies have brought a wealth of information. Little attention has, however, been given to phylogenetic systematics. This is disappointing, since the evaluation of phylogenetic relationships gives a relative time frame for historical events. We have tried to assemble all relevant information.

In recent years much progress has been made in reconstructing the complicated geological history of the island. On the basis of recent geological information, the distributional information contained in the present checklist and, where available, phylogenetic analyses, our current understanding of the biogeography of the butterflies of Sulawesi is reviewed.

Acknowledgements

As members of the Royal Entomological Society *Project Wallace* expedition, we would particularly like to thank Bill Knight, the administrators of LIPI (Jakarta), and the many expedition team members we worked with in Sulawesi in 1985 for making this project a reality. We are grateful to the UK NERC Taxonomic Publications Grant Programme, administered by the Linnean Society of London, for generous support in defraying the costs of the coloured plates. We wish to thank Hideuki Chiba, Julie Harvey, Axel Hausmann, Jeremy Holloway, Lee and Jackie Miller, John Tennent, Andrew Rawlins, Shen-Horn Yen and Gerardo Lamas for help with many taxonomic, biogeographical and bibliographical questions. Special thanks are also due to Phillip Ackery, Alan Cassidy, John Eliot, Jane Goode, Djunijanti Peggie, Bob Smiles, Campbell Smith and Osamu Yata. At various stages in the production of this work they made significant contributions to its content. Formerly it was our intention to include many or even all of them as co-authors. However, over the last eight or more years the list has undergone innumerable changes due almost entirely to the input of RdJ and RIVW (Osamu Yata contributed more recently with guidance on particular genera, notably *Appias*). As none of our collaborators has had the opportunity to work on the numerous iterations and revisions, or even sections of it, we have decided that authority must rest with just the two of us: all errors of commission and omission are solely our responsibility. The debt we owe to our colleagues is nonetheless considerable, and we hope that inclusion of their names under the title goes some way to acknowledging our special dues. Finally, we acknowledge Jeremy Holloway and Harish Gaonkar for making numerous suggestions for improving and correcting the final manuscript, many of which we have gratefully adopted.

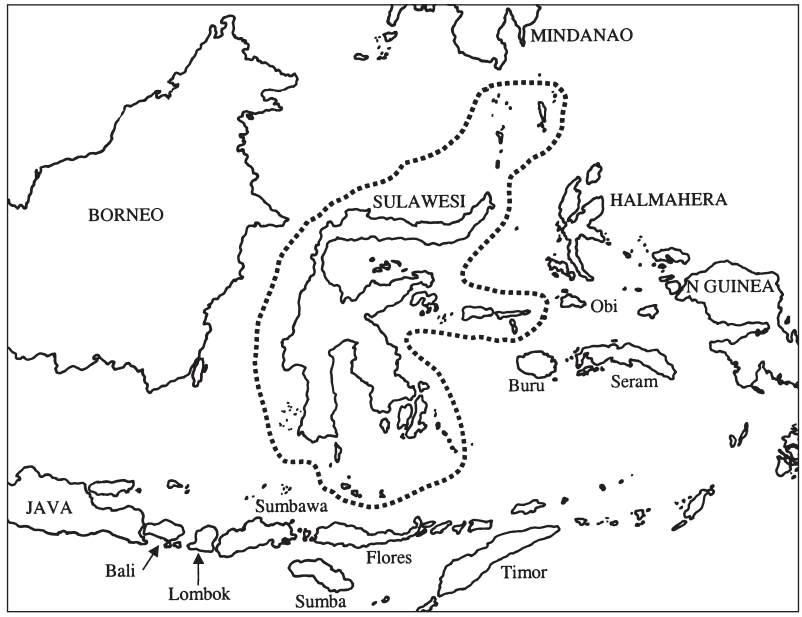

Fig. 1. Sulawesi lies at the heart of the Malayan Archipelago. The pecked line encloses the Sulawesi Region, the area covered in this publication.

Sulawesi and its place in the Malay Archipelago

Topography

Sulawesi, eleventh largest island in the world, lies almost literally at the heart of the great Malay Archipelago (fig. 1). Immediately to its west is Borneo, the world's third largest island, four times the area of Sulawesi, the two being divided by about 120 km of open sea at the northern end of the Makassar Strait. To the north is Mindanao, main island of the southern Philippines, a little over half the area of Sulawesi. Although the two are separated by 400 km of the eastern Celebes Sea, an oceanic ridge with scattered islands lies between. Notably, the Sangihe Archipelago occurs at the half way point, and the largest uninterrupted sea gap in this whole chain is about 80 km (although many of the intermediate islands are very small). Some 700 km to the east is New Guinea, largest tropical island in the world, well over four times Sulawesi in area. Almost filling the Moluccan and Seram seas between the two, however, are the extensive islands of northern and central Maluku (the "Moluccas"), as well as the Banggai and Sula archipelagoes which together extend over 300 km to the east from Sulawesi. As a result the largest uninterrupted sea gap between Sulawesi and New Guinea is no more than 120 km. Approximately 600 km to the south-west lies Java, two-thirds the size of Sulawesi and fifth largest island in the Archipelago. The uninterrupted distance between southern Sulawesi and eastern Java is probably no more than 110 km, by way of the substantial Lesser Sunda islands of Flores, Sumbawa, Lombok and Bali, and the many smaller islands of the Flores Sea.

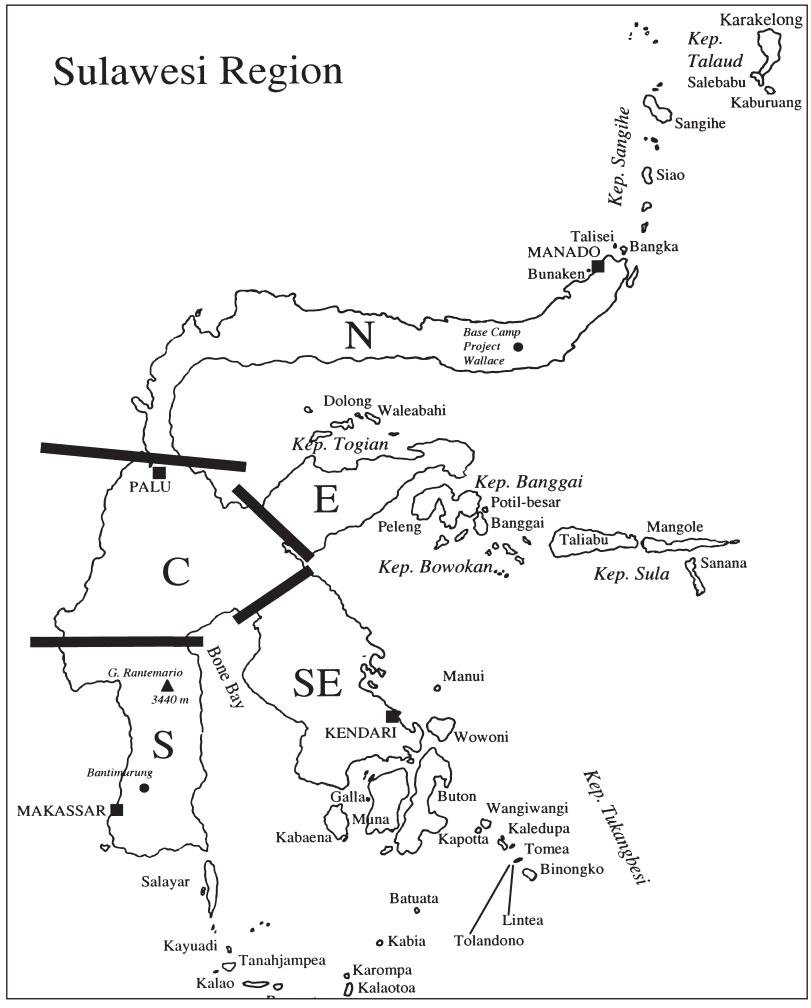

Fig. 2. The Sulawesi Region. All names of islands of this region mentioned in this publication can be found here, with the spelling adopted (mainly after Whitten *et al.*, 2002). The thick lines are the approximate boundaries of the areas used here; they do not coincide with provincial boundaries.

The Sulawesi Region

In addition to the main island of Sulawesi, the Sulawesi Region (sensu Vane-Wright, 1991) covers the Sangihe and Talaud archipelagoes to the north, the Banggai and Sula archipelagoes to the east, Buton and nearby islands, and the Tukangbesi archipelago to the south east, and islands to the south including Salayar and Kalao (fig. 2)[2]. This is essentially the region described by Whitten *et al.* (1987, 2002), except that Kep. Sula is politically part of Maluku province.

[2] In the rest of the paper we shall use the Indonesian word *kepulauan* for archipelago, abbreviated to Kep.

Outline of present-day ecology

A detailed treatment of the ecology of Sulawesi, with extensive literature references, is presented by Whitten *et al.* (1987, 2002). For the present purpose we are mainly interested in surface relief, climate and vegetation.

Sulawesi is a mountainous island, reaching its highest point in the Latimojong Mountains (Gunung Rantemario, 3440 m) in southern Torajaland (northern part of the southwest arm), with a number of other peaks over 3000 m in C Sulawesi. Going north, east and south the mountains are generally lower, but in the extreme south of the southwest arm Gunung Lompobatang still reaches 2871 m, and peaks of over 2000 m are also found in the other arms. There are 10 volcanoes, mainly in the northeast tip of the north arm and in the Sangihe Archipelago that have erupted in historical time. In addition there are a number of mountains with volcanic activity, like fumaroles. Extensive land below 1000 m is mainly found in the various arms and less so in the central part of the island.

Rainfall is not evenly distributed over the island. In November-December cool northwesterly winds bring moisture to the west coast, but the central part of this coast is sheltered from these winds by Borneo. Around February humid winds blow from the southeast. The eastern part of Sulawesi receives most rain between April and June. When Australia cools down (winter) the southeasterly winds become stronger and dryer, particularly influencing the climate on the southern tips, where the dry season may last from April until November.

The general rainfall scheme is locally modified by mountain ranges. While Maros, on the west side of the southwest arm, receives over 500 mm per month during the rainy season, towns on the other side of the peninsula are in the rain shadow and receive little. The effect of mountains is even more strongly expressed in the Palu Valley, sheltered as it is by north-south mountain ridges. While the surroundings receive 2500-3000 mm rain per year (and the mountains even more), the Palu valley has an annual rainfall of less than 600 mm.

In addition to altitude and climate, exposure, soil chemistry, soil quality and structure are important factors affecting the vegetation. Much of the eastern and southeastern arms consist of ultramafic and mafic rocks, with Neogene and Quaternary sediments in large parts of the southeastern arm (and on the islands of Muna and Buton). There is continental basement in the Banggai-Sula block and the opposite part of the eastern arm, largely covered with carbonates. Much of the western part of the island and the northern arm consists of Cenozoic volcanics and volcaniclastics, interspersed with Tertiary sediments. Extensive areas of Quaternary sediments are found in the central part of the southwestern arm, and along the west coast northwards. Tertiary carbonates, once covered by volcanics, but exposed again due to erosion of the volcanic upper layer, are mainly found in the southern half of the southwestern arm and locally in the northern part of the southwestern arm. One such area, east of Maros (north of Makassar, for many years known as Ujung Pandang), is famous among collectors for the numerous butterflies found along the river (fig. 5). Near the village of Bantimurung the river empties from the Eocene and Miocene coral limestone hills onto the plains. The locality is not only attractive to butterflies, it is also a popular weekend resort for the people of Makassar who seek cooling in the river under the waterfall. The waterfall is part of a nature reserve.

Fig. 3. Lowland forest along the Sungai Tumpah, Dumoga-Bone National Park, Sulawesi Utara, near Project Wallace Base Camp, 225 m, 25th April 1985.

Fig. 4. *Appias zarinda* (left) and four species of *Graphium* (*androcles*, *rhesus*, *eurypylus*, *anthedon*) along Sungai Tumpah, 225 m, Dumoga-Bone National Park, Sulawesi Utara, near Project Wallace Base Camp, 10th May 1985.

Outline of present-day vegetation

The island must once have been almost entirely covered with lowland and montane primary rain forest, varying in composition according to soil type and variation in rainfall (figs 3, 6-9). Forests on limestone mainly occur in the southwest and southeast arms. Forests on ultrabasic soils are mainly found in the northern part of the southeast arm. Much of central Sulawesi and the northern part of the southwest arm, stretches in the north arm, and mountain ridges elsewhere, are clad in montane forest (figs 6-9). In the southern part of the southeast arm, where the climate is more pronouncedly seasonal, lowland monsoon forest occurs. Much of the lowland forest, particularly in areas with high population pressure like the southwest arm, the southern part of the southeast arm and the tip of the north arm, is disturbed, degraded, or completely gone. The disturbance may go quite high into the mountains. Around West Toraja, for instance, hardly any forest is left up to 1600 m (fig. 8). A number of rather extensive forest areas are protected, like Dumoga-Bone in the north arm (the main site of Project Wallace; fig. 3), Lore Lindu in the central part, and Morowali at the base of the eastern arm (see Collins *et al.*, 1991: map 19.5).

Although not contributing much to the butterfly fauna, large stretches of inland swamp must be mentioned. They are mainly found near the west coast of Central Sulawesi, and in the north and the south of the southeast arm. The last area, the Aopa swamp, about 100 km west of Kendari, is the only major area of peat swamp in Sulawesi. It forms part of the Rawa Aopa-Watumohae National Park. Another type of vegetation that does not contribute much to the butterfly fauna is mangrove (although populations of the very variable species *Danaus affinis* should be sought there). Most mangrove is found along the northern part of the Bone Bay (between the southwest and southeast arms) and along the coast of the southeast arm. Most of the west and north coast of Sulawesi is devoid of mangrove vegetation.

Outline of geological evolution

The region is of very great interest to geologists, and access to much of the older geological literature, together with valuable accounts of current ideas on the geological history of the area, can be found in Hall & Blundell (1996), Hall & Holloway (1998) and Hall (2002). A good review of recent findings and conclusions with regard to Sulawesi was presented by Moss & Wilson (1998). Sulawesi originated from a number of tectonic provinces that during the Cretaceous and Tertiary accreted onto Sundaland. The following areas will be discussed: west, central, and part of southeast Sulawesi; east and part of southeast Sulawesi; north Sulawesi; south Sulawesi; Banggai-Sula block; Buton-Tukangbesi block. In addition, a few words will be said on the evolution of the Moluccas and the Philippines, since these islands may have played a part in the colonisation of Sulawesi (cf. Mey, 2003).

By the late Cretaceous west Sulawesi had been accreted to Borneo and there was continuous land. West, central, and parts of the SE arm of Sulawesi are thought to have formed a contiguous land area during the early Paleogene, and at least west Sulawesi, connected to Borneo, appears to have been emergent up to the early Eocene. In the middle of the Eocene, approximately 42 Ma, the land connection between Borneo and Sulawesi was severed and the Makassar Strait formed. Much of the land of proto-Sulawesi disappeared below sea-level, and only a number of small islands

may have been in existence until the middle Miocene. There was, however, a volcanic arc, part of which may have been emergent, extending down the east side of western Sulawesi into southern Java. Probably land areas became emergent in central Sulawesi as a result of the late Oligocene collision of the east and part of southeast arm onto west Sulawesi. In late Miocene and Pliocene there were extensive low lying land areas in west, central and east Sulawesi. Pliocene collisions and subduction east of Sulawesi resulted in uplift of extensive areas in Sulawesi, and rapid uplift of high mountain areas, particularly in central Sulawesi.

The east arm and part of the southeast arm, drifting from the edge of the Australian plate, remained submerged until after they had accreted onto Sulawesi in late Oligocene (*ca* 18 Ma). Since Miocene times (*ca* 20 Ma) there has been extensive low lying stretches of emergent land.

The north arm is composed of thick Tertiary sedimentary and volcanic deposits. There was a volcanic arc in Miocene and Pliocene, related to the south-dipping subduction of the Celebes Sea oceanic crust under the north arm. Some of the volcanoes may have been emergent. The Quaternary to Recent arc of active volcanoes running from the eastern part of the north arm through the Sangihe Islands, is related to west-dipping subduction under this area. During the early Pliocene most of the north arm was submerged. Similarly, the south arm was below sea level for much of the Tertiary, except for emergent volcanoes. Probably only in the Pliocene did the island areas of the south arm become connected with the land area in central Sulawesi.

During the Miocene or earliest Pliocene two microcontinental blocks, Banggai-Sula and Buton-Tukangbesi, accreted onto east Sulawesi, undoubtedly resulting in the formation of emergent land areas. These blocks rifted from the margins of the Australian continent in the late Mesozoic. After rifting they submerged and only became emergent in the Tertiary. Consequently, no Australian fauna or flora could have been rafted on these microcontinental blocks. On the other hand, the emergence of areas of dry land between Sulawesi and the steadily northwards-drifting Australian continent may have facilitated island hopping.

Similarly, although there was no dry land between Sulawesi and the coast of Australia-New Guinea before the Miocene emergence (Audley-Charles, 1986, 1993), the emergence of (part of) the Moluccas must have made the distance between Sulawesi and New Guinea considerably shorter. Fortuin & de Smet (1991) estimate the time of emergence of Seram at 5 Ma, and a similar figure may apply to other islands of the Moluccas. Halmahera in the northern Moluccas, however, itself of composite origin, has a very different history (for a summary, see Hall *et al.*, 1995). It was part of an island arc that also comprised the east Philippine islands, as well as Waigeo, Biak, Yapen and parts of present-day northern New Guinea. At 10 Ma Halmahera still lay approximately 800 km southeast of its present position (Rangin *et al.*, 1990). Probably it was mainly submerged for much of its life. The younger, volcanic western part and the much older (Cretaceous or older) eastern part collided only between 3 and 1 Ma. The island reached its present position only recently and is still moving westward. Thus it has never been closer to Sulawesi than nowadays, and faunal exchange has never been so easy. However, there is still a relatively long stretch of sea between the islands.

Not only the Philippine archipelago as a whole, but also several of its compo-

Fig. 5. Gate to the Bantimurung waterfall, near Maros, Sulawesi Selatan, 50 m, 10th June 1985. In later years the butterfly gate was replaced by a gate with a huge monkey, but the butterflies still abound along the water.

Fig. 6. Lower montane forest in Dumoga-Bone National Park, Sulawesi Utara, Edward's subcamp, Project Wallace, 780 m, 30th April 1985.

Fig. 7. View from top of Gunung Sampapolulu, 1590 m, Pulau Kabaena, Sulawesi Tenggara, 3rd November 1989; monsoon forest and natural grassland.

Fig. 8. Practically all forest up to c. 1600 m has been cleared in West Toraja; vicinity of Mamasa, 1650 m, Sulawesi Selatan, 10th April 1991.

nent islands (including Mindanao, the main Philippine island closest to Sulawesi) are of a composite nature (Rammlmair, 1993; Hall, 1998). Much of the eastern islands once belonged to an island arc of which Halmahera and, at an earlier stage, the north arm of Sulawesi also formed parts. Although there must have been areas of dry land (e.g. emergent volcanoes), their extent is unclear and it seems unlikely that possible similarities between the faunas of Sulawesi, Halmahera and the Philippines are due to their once having belonged to the same island arc. We are of the opinion that butterfly exchange between Sulawesi and the Philippines has been largely dependent on the dispersive powers of the insects. Substantial exchange (which may still be going on) only became possible in the Pliocene, when north Sulawesi emerged from the sea and the Philippine islands reached their present position.

The repeated drop in sea level during the Pleistocene as a consequence of glaciations in the northern hemisphere did not bring the Moluccas or the Philippines much closer to Sulawesi, but the southeastern coast-line of Borneo extended considerably eastward to Sulawesi. Even during the last 17000 years sea level was 100 m below present level for about 4000 years (Voris, 2000), bringing Borneo within about 50 km from Sulawesi. Based on distance alone faunal exchange between these islands cannot have been more difficult than between Sulawesi and the Moluccas or the Philippines.

Biogeography of Sulawesi butterflies

Ever since Alfred Russel Wallace (in a letter to Henry Bates in 1858, and in a series of later publications) proposed the idea of a line (the so-called Wallace Line, Huxley, 1868) dividing the Asian and Australian faunas, the region has been of exceptional interest to biogeographers (for reviews, see Whitmore, 1981, 1987; Holloway, 1997; Turner *et al.*, 2001). Wallace's views on the exact position of the line changed with time, from between Borneo and Sulawesi (Celebes) to east of Sulawesi. This had to do with the enigmatic nature of the fauna of Sulawesi. Later authors proposed still other demarcation lines, depending on the group of animals studied. The easternmost of these lines (Lydekker's Line and part of Weber's Line) followed the 180 m line of the Sahul shelf between New Guinea and the Moluccas, while the original Wallace Line to the west of Sulawesi more or less followed the 180 m line of the Sunda shelf. Debate and discussion of these supposed lines continues to this day (e.g. Atkins *et al.*, 2001) but, as Williams *et al.* (1999) have demonstrated for African birds, it is not realistic to look for simple "lines", but rather investigate transitions in terms of species richness and species turnover (cf. Holloway & Jardine, 1968). Such methods have yet to be applied to the Malay Archipelago.

The sea between the Sunda shelf and the Sahul shelf is deep. The islands in this area were called Wallacea by Dickerson (1928), suggesting that they have much in common, but actually the faunas of the included islands may differ considerably, particularly on Sulawesi, where endemism is high.

The first major account of the butterflies of Sulawesi was in a series of papers by Martin (1914-1920, 1920-1924, 1929; see also Röber, 1940). The biogeography of Sulawesi butterflies has been discussed by a number of authors, including Toxopeus (1930), Röber (1940), Holloway & Jardine (1968), de Jong (1990), Vane-Wright (1991), Holloway (1991, 2003) and Vane-Wright & Peggie (1994). See also Otsuka (1996), who

concludes that there is almost no influence of Sulawesi on the butterflies of Borneo.

The composition and distribution of the butterfly fauna of Sulawesi were discussed at length by Vane-Wright (1991) in relation to the known or assumed geological evolution of the area. He concluded that "the original terrestrial biota of Sulawesi was Asian, and that collision with the Australian Plate 15 [Ma] brought few (if any) Australian Region butterflies directly to Sulawesi." and a "significant increase in the land area of Sulawesi over the last 15 [Ma] could offer an explanation for the island's relatively low number of species." To reach these conclusions he analysed the links between the butterfly faunas of Sulawesi and surrounding islands at species and genus level, and also used the few relevant cladistic analyses available. While generally still supporting these conclusions, we present an update of the analysis.

As already described, Sulawesi is a composite island that originated from the accretion of several land areas which were islands since the early Tertiary. It implies that most, if not all, butterflies on Sulawesi are progeny of species that crossed water gaps. Success of colonization is dependent on finding the right habitat and, most importantly for Lepidoptera, the right foodplants. Apart from geological evolution, ecological evolution must have played a major role in the distribution of the butterflies. Similarly, present-day ecology is important in the distribution within the island. Unfortunately, as stated above, the ecological requirements of most of the species are poorly known in detail. There is some general knowledge of foodplants and broad habitat preferences (like open grassy areas, open forest, closed forest, etc.), but altitudinal ranges, for instance, are poorly documented. This lack of knowledge hampers the analysis of a possible correlation between distribution and ecology.

High endemism, low richness: basic puzzle of the Sulawesi butterfly fauna

All of the major islands and island groups surrounding Sulawesi, together with a few others such as Palawan (850 km to the nor-nor-west), are areas of endemism. Given the central position of Sulawesi, it is surprising that its butterfly fauna is relatively more endemic than any of the immediately surrounding islands. Equally, given its large size as well as centrality, the smaller absolute size of its butterfly fauna in comparison to the smaller and seemingly peripheral islands of Mindanao and Java is also surprising. Noteworthy also is the comparison with Borneo: only 120 km away, it has more than twice the number of butterfly species found on Sulawesi, a magnitude of difference not readily explicable by its greater size alone. The basic figures per family are given in table 1.

Table 1. Number of endemic and non-endemic species in the Sulawesi Region per family. SR = endemic to (some part of) the Sulawesi Region, Sul = restricted to the island of Sulawesi, si = restricted to satellite islands.

	total	non-end	SR	Sul	si
Hesperiidae	87	63	24	15	0
Papilionidae	40	25	15	7	4
Pieridae	52	26	26	14	4
Lycaenidae	183	106	77	50	11
Riodinidae	4	4	0	0	0
Nymphalidae	191	94	97	47	9
total	557	318	239	133	28

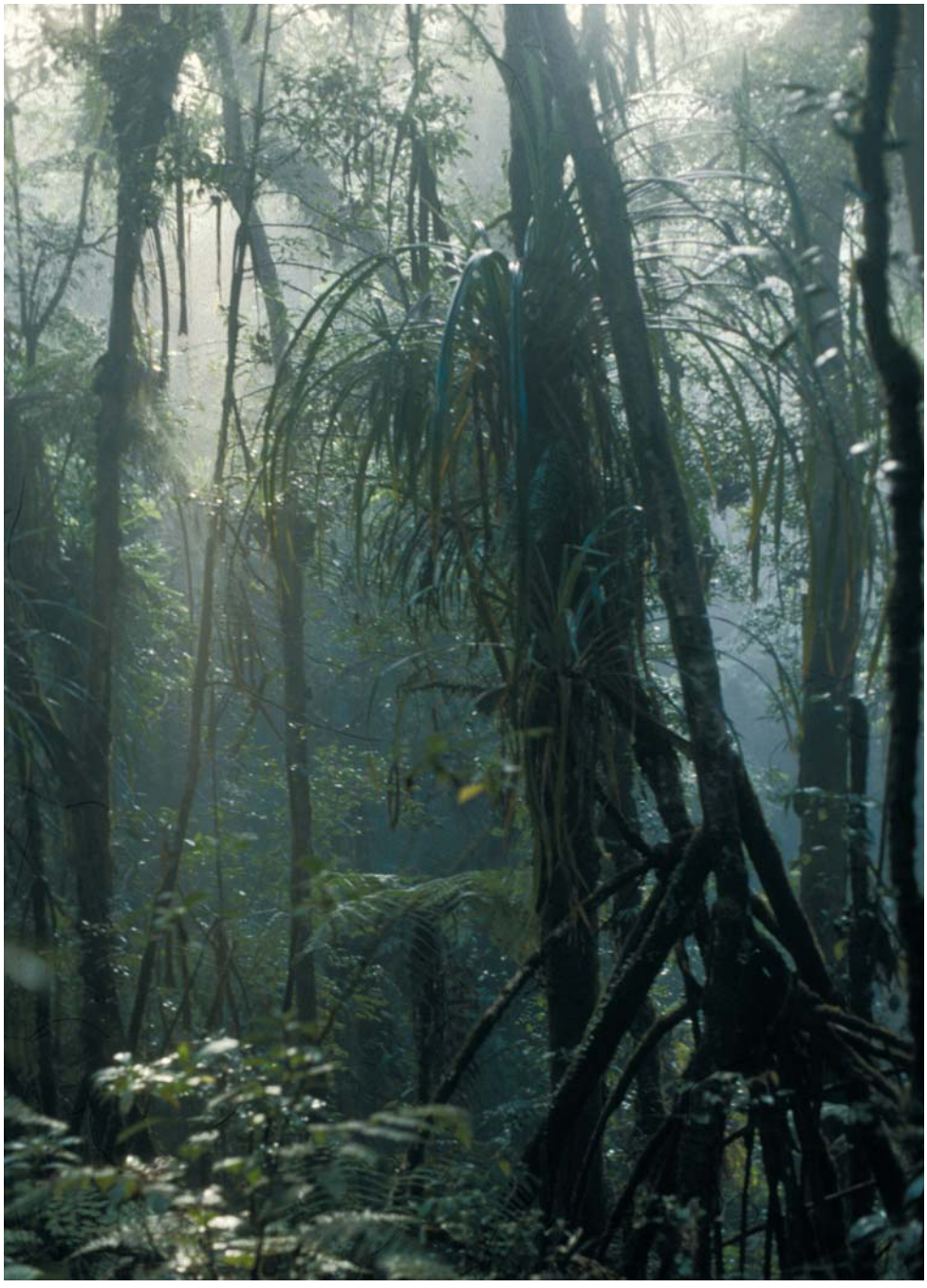

Fig. 9. Montane forest at top of Gunung Muajat, 1780 m, east of Kotamobagu, Sulawesi Utara, 31st May 1985.

Non-endemic faunal elements

As noted above, Vane-Wright (1991), based on the original version of this checklist prepared for *Project Wallace*, analysed the distribution patterns of the non-endemic Sulawesi butterfly fauna in an attempt to understand this problem. He enumerated and tabulated the Sulawesi species and genera shared with seven surrounding areas of endemism, singly and in any of the 120 possible combinations of these areas. Those taxa found in all seven surrounding areas were considered uninformative, as were the endemic taxa, which can only be made informative in the light of cladistic analyses (as already indicated, still lacking for more than a fraction of the taxa). Vane-Wright concluded that two general patterns could be observed. First, an 'older' pattern, based on the analysis of genera, which linked Sulawesi to Asia, but with no special links to Borneo. Not a single, currently recognised butterfly genus is restricted to Sulawesi + Borneo – although the rare and rather widespread *Artipe* appears to hold that distinction when looking at just the seven areas and Sulawesi. Second, a set of 'younger' patterns, based on the analysis of non-endemic species, links Sulawesi to Maluku, the Philippines and the Lesser Sunda islands, in addition to the Asian pattern, also strongly evident in the species distributions. Of these so-called younger patterns, Vane-Wright (1991) concluded that the link to the Moluccas was the "most pronounced."

Faunal analysis revisited

Since 1991, the number of species recorded in our Sulawesi list has increased modestly, from 470 to 488 for the island of Sulawesi only (to 557 for the Sulawesi Region), and the number of genera likewise, from 183 to 191 (194 for the Sulawesi Region). Some of these changes are due to new discoveries, others to changing taxonomy. However, in terms of the distribution of non-endemics, other changes also involve refinement in our documentation and knowledge of the surrounding areas, and in particular the fauna of northern and central Maluku. Vane-Wright & Peggie (1994) demonstrated that these two areas were indeed separate areas of endemism, and that Obi (treated as "ambiguous" by Vane-Wright, 1991) clearly belonged, on the basis of its faunal composition, to northern Maluku. Their work depended on still largely unpublished lists (Peggie *et al*., 1995, is the exception) documenting the entire Maluku butterfly fauna, and we have drawn on these compilations to refine our estimates of the ranges of the non-endemic Sulawesi genera and species. The publications of Seki *et al.* (1991), Corbet & Pendlebury (1992), de Jong & Treadaway (1993c), Treadaway (1995), and Parsons (1999) have also been of great help in this general faunal documentation, together with a host of scattered papers by many different authors, often dealing with discoveries of individual new populations and subspecies.

Although quite a lot of details have thus changed, and the tabulated numbers and percentages now differ as a result, the overall conclusions of Vane-Wright (1991) remain broadly valid – at least, in terms of any analysis along the same lines. Rather than duplicate the entire discussion and argumentation presented in Vane-Wright (1991), we present here just the basic information about the areas used in the analyses, together with four tables: one for genera and one for species, corresponding to tables 2 and 3 in Vane-Wright (1991), a third concerning within-Sulawesi distributions, and a fourth dealing with endemism. Given the descriptive distributional account presented

for each taxon, together with the codes indicating distribution in the seven surrounding areas, all the data are explicit in the checklist, and available to anyone who might wish to make their own analyses.

The areas and codes

Sulawesi is defined here as the main island bounded by its sea shore.

(E) Known distribution entirely within the island. Butterfly taxa found widely but apparently never beyond the shoreline include *Aoa*, *Bletogona*, and the subgenus *Pseudamathusia*.

Sulawesi Region includes numerous offshore islands, extending to Talaud to the north, Sula to the east, Buton, Tukangbesi to the south-east, and Salayar, Tanahjampea, Kalao and other islands to the south (fig. 2).

(R) Taxon with known distribution entirely bounded by the Sulawesi Region, including records for at least one of its off-shore islands in addition to confirmation for the main island. Such regional endemics include *Lohora*, *Papilio gigon* and *Neptis ida*.

(L) Taxon with distribution bounded by Sulawesi Region, but no records from the main island. Such local endemics include *Troides dohertyi*, found only in the Sangihe and Talaud archipelagos.

(P) Taxon occurring both within and beyond the Sulawesi Region, but without any records from the main island. Such peripheral butterflies include *Papilio rumanzovia*, likewise found in Sangihe and Talaud, but also beyond, in the Philippines.

(1) Palawan. Palawan island and its close "satellites". Endemics include *Trogonoptera trojana* and *Elymnias parce*.

(2) Mindanao. The southern Philippines: Mindanao, Basilan, Bohol, Leyte and Samar. Endemics include *Papilio antonio* and *Discophora philippina*.

(3) Northern Maluku (as defined by Vane-Wright & Peggie, 1994). Halmahera, Morotai, Ternate, Batjan and Obi. *Hypochrysops siren* is endemic to this area.

(4) Central Maluku (as defined by Vane-Wright & Peggie, 1994). Buru, Seram, Ambon, Saparua and various smaller islands. *Delias dorimene* and *Hypolimnas pandarus* are among those species restricted to this area.

(5) Lesser Sunda Islands (with Bali as ambiguous). The great chain of small islands, from Bali and Lombok east through Flores to Timor and Tanimbar. Endemics to this area include *Melanitis belinda* and *Delias sambawana*.

(6) Java (with Bali as ambiguous). Java, Bali and some minor offshore islands. Species restricted to this area include *Ypthima nigricans* and *Cyrestis lutea.*

(7) Borneo. The main islands and its close "satellites", including Laut. Endemics include *Troides andromache* and *Chersonesia excellens*.

Combination codes are used to specify the distribution of Sulawesi taxa on two or more of the seven surrounding islands or island groups. Thus, if there were a butterfly known only from Sulawesi, Palawan and Flores, it would be coded (1+5). No such taxon has been found - and indeed, of the 120 possible combinations involving 2, 3, 4, 5, 6 or 7 islands at a time, less than half (52) are supported by empirical evidence and, of these, no less than 19 are represented by just single examples. The most common combinatorial pattern of all involves all of the surrounding islands (1+2+3+4+5+6+7), coded more simply as widespread (W) in the checklist: a total of

Table 2. Principal, repeated, potentially informative distribution patterns amongst non-endemic butterfly genera found on Sulawesi (all totally widespread and Sulawesi Region endemic genera excluded, together with patterns exhibited by only one genus). The eight repeated patterns not tabulated here were supported by just two or three examples each. The top 4 of the 14 repeated patterns account for 65% of the 89 genera covered by the table, and represent all of the surrounding areas except northern and central Maluku. This is the 'older', Asian pattern discussed in the text.
The coded areas are 1: Palawan, 2: Mindanao region, 3: northern Maluku, 4: central Maluku, 5: Lesser Sunda Islands, 6: Java, 7: Borneo.

pattern	percent	no. of examples
1+2 + 5+6+7	28.1%	(25)
1+2 + 6+7	20.2%	(18)
1 + 5+6+7	9.0%	(8)
2 + 6+7	7.9%	(7)
1+2 +4+5+6+7	6.7%	(6)
1+2+3+4 +6+7	5.6%	(5)
Eight others	22.5%	(20)
	100.0%	(89)

Table 3. The ten most strongly supported biogeographic patterns shown by native, non-endemic Sulawesi butterfly species, as subsets of the seven surrounding areas of endemism. Endemic, peripheral and totally widespread species have been disregarded. Two major classes of these 'younger' patterns are evident: Asian links involving combinations of areas 1, 2, 5, 6 and 7, very similar to those seen in the generic analysis, and an eastern linking of Sulawesi with the Moluccas. Components linking to the north (Mindanao) and to the south (Lesser Sundas + Java) are also apparent, and are stronger than any pattern linking exclusively to Borneo (just five species exhibit this pattern, not shown here as it lies outside this 'top ten').
For area codes, see table 2.

pattern	percent	no. of examples
2	7.4%	(8)
3	10.1%	(11)
3+4	12.0%	(13)
5+6	11.1%	(12)
1 + 6+7	7.4%	(8)
5+6+7	7.4%	(8)
1+2 + 6+7	17.6%	(19)
1 + 5+6+7	2.7%	(3)
1+2 + 5+6+7	19.4%	(21)
1+2+ 4+5+6+7	3.7%	(4)
	100.0%	(107)

130 genera and species found on Sulawesi show this uninformative pattern. The second most common pattern involves five areas (1+2+5+6+7); a total of 45 species and genera found on Sulawesi have this pattern, equivalent to widespread other than in N and C Maluku. The distributions of all but one of the total of 751 genera and species recorded here from the Sulawesi Region can be encoded by this system - the distinctive nymphalid genus *Pseudergolis* being the lone exception. Represented on Sulawesi by a single endemic species, this disjunct genus is not recorded from any of the surrounding islands, but recurs only on the Asian mainland; in our list

this single exception is coded (D). Finally, it should be noted that a few species are listed that are considered very uncertain with respect to their genuine presence in Sulawesi, and no distribution code is given for any of these. Likewise, if a species is known, for example, from Sulawesi, Borneo and Java, but only tentatively for the Lesser Sundas, it is coded as (6+7), not (5+6+7), nor even (5?+6+7).

Are there distributional patterns on Sulawesi itself?

In the checklist the distribution over the island of Sulawesi has been very roughly indicated by N, C, S, E and SE (not exactly coinciding with the four administrative provinces). The inventory is far from exhaustive. In particular, the east and southeast arms are underrepresented: published records are much scarcer than for the other parts, and some good collections from these areas still await working up. Even so, if we only take the species in N, C and S into account, a remarkable pattern is evident (Table 4). Of the 356 non-endemic species on Sulawesi, similar numbers of species occur in N, C and S (columns 8-10 in Table 4). However, if we break these numbers down according to their distributional width, the distribution is not as even as it may seem. Supposing that a non-endemic species occurring in N and S, but not known from C, has been overlooked in C, the number of species widespread on Sulawesi is 246 (70%). Disregarding the few non-endemics that for unclear reasons are restricted to C (perhaps overlooked in N and S, or with narrow ecological tolerance), we find that the number of species restricted to N (24) and to N+C (27) together make up 14.3% of the non-endemics, while the number of species restricted to S (34) and to C+S (15) together make up 13.8% of the non-endemics. Far fewer species are restricted to C, and the total number in C (52, or 14.6%: 42 N+C and S+C, plus 10 restricted to C) is only so high because of overlap of N+C and S+C. In other words, the non-widespread non-endemics show peaks in N and S. Considering that the butterfly fauna on Sulawesi is the result of immigration, these figures suggest that the non-endemics restricted to the northern or southern parts of Sulawesi are later arrivals (from the Philippines and Java/Lesser Sunda Islands, respectively; a historical explanation) or slower dispersers (an ecological explanation) than the non-endemics which are widespread on Sulawesi. Moreover, the higher number of species restricted to N+C than to S+C may point to an easier dispersal from N to C than from S to C, that is to say, barriers between N and C are less severe than between S and C.

The within-island distribution of endemic taxa will be discussed below.

Table 4. Distribution of non-endemic and endemic species over N, C and S Sulawesi (E and SE have been disregarded, see text). The numbers in the first seven columns (N to N+C+S) refer to species restricted to the marked areas. In this table, endemic species are species restricted to the island of Sulawesi only; all other species on Sulawesi also occurring on other islands, even when restricted to islands of the Sulawesi Region, have been considered non-endemic.

	N	C	S	N+C	N+S	C+S	N+C+S	N total	C total	S total
total	38	50	50	47	17	23	263	365	383	353
non-end (Sul)	24	10	34	27	16	15	230	297	282	295
end (Sul)	24	40	16	20	1	8	33	68	101	58

Endemism, and Sulawesi as a critical island fauna

Generic level endemism

As yet we do not have sufficient collated data available to evaluate Sulawesi Region generic endemism in relation to other parts of the Malay Archipelago, but at 3.6% it appears to be modest (cf. genus level endemism for New Guinea calculated at 14.8% by Parsons, 1999: 33). The significance of this Sulawesi endemism is uncertain. Six of the seven genera involved have only one (*Ilma, Aoa, Nirvanopsis, Lamasia*) or two included species (*Bletogona, Uranobothria*). The exception is *Lohora* (Satyrinae: Mycalesina), with 17 species currently recognised. Unlike most mycalesines, however, the species of *Lohora* are difficult to separate by their male genitalia, and the status of several remains doubtful (Vane-Wright & Fermon, in press). Moreover, the characters by which *Lohora* is separated from *Mycalesis*, other than certain constant modifications to the wing-pattern and venation groundplan, are not clear to us. This suggests the possibility that *Lohora* represents an internal subgroup of *Mycalesis* that has undergone recent radiation in the Sulawesi Region. The genus would make an excellent subject for investigation by molecular systematics.

Species endemism: Sulawesi as a critical island fauna

Species level endemism in the Sulawesi Region exceeds 40%. This is very high compared to the Malay Peninsula (2%: Corbet & Pendlebury, 1992). It is also high in comparison to most of the surrounding islands, with the exception of the collective Philippine islands proper (Philippines minus Palawan group), which approach the same level (Treadaway, 1995; de Jong & Treadaway, 1993c; Vane-Wright, 1990; Vane-Wright & Peggie, 1994), and the very much larger island of New Guinea (46%, rising to 55% if satellite islands are included: Parsons, 1999: 22-23). For northern and central Maluku, Vane-Wright & Peggie (1994) documented levels of butterfly species endemism at about 11% and 15% respectively. Species endemism for the western Lesser Sundas, Java, Borneo and Palawan is, in each case, probably no more than about 10%, but the relevant data have yet to be collated. Although all these values pale in comparison to Madagascar (70-74% species endemism: Lees *et al.*, in press), a value of over 40% for a land area or even island the size of Sulawesi is nonetheless impressive. Notably, the Danaina plus Euploeina (Danaini) of the Sulawesi Region include 15 endemics out of a total of 38 species, making this the richest and most specialised fauna for milkweed butterflies in the world. This observation, plus the personal experience of the present authors of the ecological destruction of the neighbouring central Philippines, led Ackery & Vane-Wright (1984) to explore the idea of minimum sets of local faunas across the world that could represent all species of a particular group. The procedure they proposed, "critical faunas analysis", depended heavily on a knowledge of endemism. Collins & Morris (1985) applied this method to the Papilionidae, and as a result also recognised Sulawesi as an outstanding critical fauna for global conservation needs.

Table 5. Endemism among butterfly genera and species found in Sulawesi Region, and on Sulawesi.

Total genera found in Sulawesi Region	194
Total genera on Sulawesi	191
Total genera unique to Sulawesi Region	7
Total genera unique to Sulawesi	5
Total species known from Sulawesi Region (a)	557
Total species known from Sulawesi (b)	488
Total species unique to Sulawesi Region (c)	239
Total species unique to Sulawesi	133
Total spp. endemic to Region not on main island (d)	28
Total number of non-endemic, peripheral species	43
Percentage endemic spp. in Sulawesi Region (c/a x 100)	42.9%
Percentage endemics on Sulawesi (c-d/b x 100)	43.2%

Although the unsophisticated procedures adopted in such analyses have now been entirely superseded by methods based on assessing data for near equal-areas using complementarity (Williams, 2001), incorporating for practical conservation evaluation a far wider range of factors (Margules & Pressey, 2000; Williams & Araújo, 2000; Araújo *et al.* 2002), the present simple analysis of relative and absolute levels of endemism nevertheless underlines the significance of Sulawesi as a critical fauna. If all the native butterflies of the Sulawesi Region became extinct, the world would lose more than one in a hundred of all known butterfly species. Currently there is a very real danger of this happening to the equally significant fauna of the Philippines. Habitat destruction in Sulawesi is less advanced, but seems to be continuing, and at an alarming pace (M.F. Kinnaird and T.G. O'Brien, *in* Whitten *et al.*, 2002: xiv-xx).

Is the Sulawesi Region an area of endemism?

Vicariance biogeography relies heavily on the idea of "areas of endemism" to provide units for analysis. The definition of an area of endemism is, however, not precise. Vane-Wright & Peggie (1994) explored a simple "test" based on the expectation that, on incrementally increasing land area sub-sampled within an area of endemism, percentage endemism should rise (tending to zero as sampled area tends to zero, and tending to 100% on approaching continental and global scales). If, as a result of adding a particular area, percentage endemism falls (or at the limit remains the same), then it is likely that a boundary has been transgressed, and that two or more incomplete and separate areas of endemism are being conflated. For example, Vane-Wright & Peggie (*op. cit.*) found that on adding faunal data for Obi to data for Morotai, Bacan, Halmahera and Ternate in northern Maluku, percentage endemism for the combined area almost doubled. In contrast, on adding the Obi data to that for Buru, Seram and Ambon in central Maluku, percentage endemism fell from 15% to 14%. From this they concluded that Obi belonged to an area of endemism they termed N Maluku, and not to C Maluku. On combining the data for N and C Maluku, percentage endemism increased to 21% (although, for other reasons, Vane-Wright & Peggie concluded that the two areas taken together did not form "a well-marked" area of endemism).

On adding data for all the peripheral islands included here as part of the "Sulawesi Region", it is notable that percentage species endemism drops slightly (Table 5). This suggests that, although convenient for the purposes of our checklist, the Sulawesi

Region as defined here is not a fully coherent area of endemism. Further work is needed to establish the natural limit of the Sulawesi endemic area. Almost certainly it will be found that, for example, inclusion of data for close island and island groups like Muna and Kep. Banggai will increase total percentage endemism, whereas more remote islands and island groups such as Kalao and Kep. Talaud will reduce it (as they almost certainly sample the fauna of the western Lesser Sunda and Mindanao regions, respectively, to which they most probably "belong"). In order to make any such tests, comprehensive data sets for all the surrounding islands and areas are needed. Regrettably, we do not yet have the relevant data fully collated.

Are there distribution patterns in the endemics of Sulawesi?

The endemics of Sulawesi show a very different distribution pattern from the non-endemics (Table 4). The number of widespread endemics (i.e. occurring in N and C and S - a total of 32) is only 25% of the total number of endemics, quite different from the 70% of widespread non-endemics. Comparing the total number of endemics in N, C and S (Table 4 columns 8-10) it becomes already apparent that C, with *ca* 76% of the endemics, is richest, but it is even more apparent if we break the numbers down into smaller areas. Of the species restricted to either N, C or S (70 in total), 57% (40) are found in C. Of the 98 species restricted to one area or two adjoining areas, 85.7% are restricted to N and/or C. In other words, C is richest in endemics in general and in narrow endemics in particular and, similarly to the situation with non-endemics, the barrier between N and C appears less severe than between C and S. The reason for this is not clear. There may be better opportunities for speciation in C, or C may have had a longer subaerial life.

Celebes forewing and gigantism: other manifestations of endemism?

In some parts of the world, notably areas of the tropics, many un-related butterfly species share a particular facies. Almost all such cases are caused by mimicry: convergence to form "rings" of aposematic and pseudaposematic species all locally similar in appearance, such as the well-known glasswings and their mimics in the neotropics, or *Amauris* and its look-alikes in Africa. In contrast, the butterflies of Sulawesi are unique in that quite unrelated species show apparent convergence in size and wing shape, seemingly unconnected with mimicry. These phenomena, known as "Celebes forewing" and "gigantism", were first noticed and commented upon by Wallace (1865, 1867, 1869). Celebes or Sulawesi forewing involves either extreme acumination of the forewing tip (well seen in *Appias zarinda*), and/or a pronounced bending of the forewing costa (as in *Idea tambusisiana*), in comparison to related species (e.g. *Appias nero*, *Idea blanchardii*). Gigantism refers to the observation that Sulawesi butterfly species are often larger than corresponding subspecies or their close relatives in surrounding areas. Good examples include *Papilio peranthus* (the Sulawesi race is far larger than the other populations of this species or complex, found in Java and the Lesser Sundas) and *Zethera incerta* (spectacularly large for a satyrid, and much larger than any of the other five species of the genus, all of which are confined to the Philippines).

Wallace described these parallelisms only among Papilionidae, Pieridae and Nymphalidae, but they are more widespread, also commonly occurring in Lycaenidae (Toxopeus, 1930). Moreover, in many Lycaenidae there are parallel shifts in

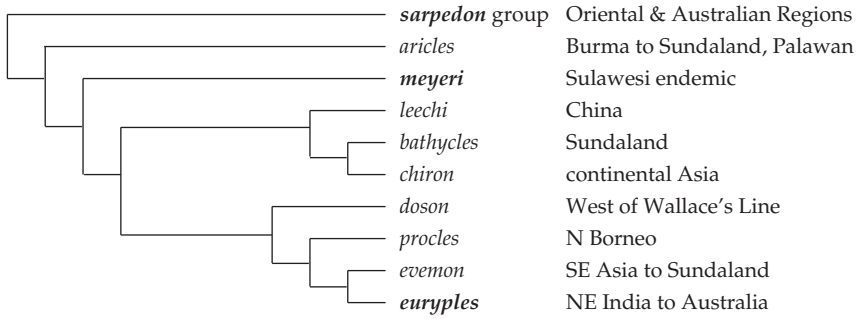

Fig. 10. Species and area cladogram of the *Graphium eurypylus* group, after Saigusa *et al.* (1982). Taxa occurring in the Sulawesi Region have been printed in bold.

wing markings (widening of dark margin on upperside of forewings in females; stronger discoidal stripe on upper and underside; expansion of eyespots, and their colour intensified; tornal spot on the underside of the hindwing with orange lunule strongly reduced, but with expanded white or pale blue distal line). Although these phenomena have yet to be investigated in a quantitative, rigorous manner, casual observations suggest they are real. Even though their origins and biological significance remain mysterious, they appear to be further manifestations of the endemism and peculiarity of the Sulawesi fauna.

Cladistic analysis

Application of phylogenetic information to biogeographic analysis renders endemic species informative, by placing them in a broader context through recognition of their sister taxa, and thereby establishing their place in the evolution of the monophyletic group to which they belong. This makes it possible to set historical events in a chronological order. Unfortunately there are not many useful phylogenetic analyses available for endemic Sulawesi butterflies. The available information is summarized here.

Graphium meyeri is a Sulawesi endemic belonging to the *G. eurypylus* group. In the phylogenetic tree for all nine species proposed by Saigusa *et al.* (1982) it occupies the most basal position but one (fig. 10). All other species are confined to the areas to the

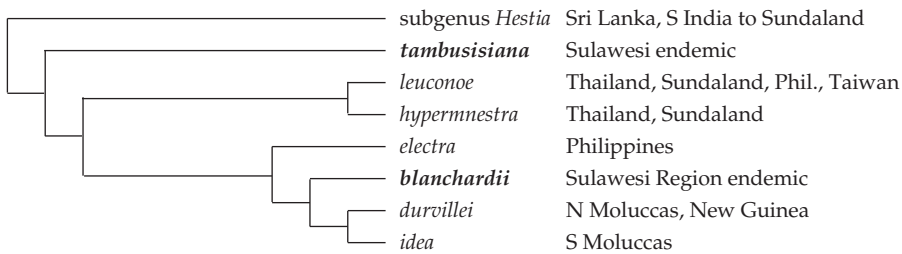

Fig. 11. Species and area cladogram of *Idea* (*Idea*), after Kitching *et al.* (1987) and Vane-Wright (1991). Species occurring in the Sulawesi Region have been printed in bold.

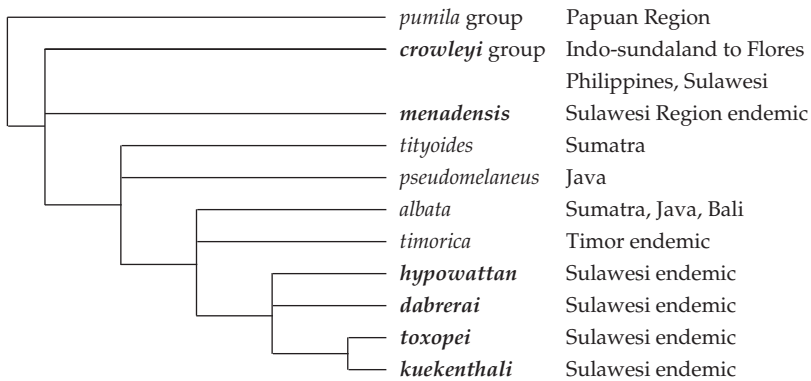

Fig. 12. Species and area cladogram of a clade of *Parantica*, after Ackery & Vane-Wright (1984). Species occurring in the Sulawesi Region have been printed in bold. According to Morishita (1985), *tityoides* is a subspecies of *pseudomelaneus*.

west and north of Sulawesi, except the crown species *G. eurypylus*, which extends from India to Australia. This strongly suggests an Asian origin of *G. meyeri*, at a relatively early date. After its separation, seven other species evolved from its sister species.

Yata (1989), analysing the Old World species of the pierid genus *Eurema*, did not find special links between Sulawesi and the Philippines or the Moluccas. The five species of the *tilaha* subgroup occur in Sundaland, Sulawesi and the Lesser Sunda Islands. Of these, only *E. tominia* occurs on Sulawesi, and is one of the very few butterflies restricted to Sulawesi and Borneo. On the basis of his phylogenetic scheme for the subgroup, Yata concluded that the two Lesser Sunda Islands endemics, *E. timorensis* and *E. lombokiana*, were the first split off. Then *E. tominia* separated on Sulawesi from the Sundaland population. The last split was between the population of Java and Bali (*E. tilaha*) and the rest of Sundaland (*E. nicevillei*). Finally, *E. tominia* spread to Borneo to become sympatric and hybridise with *E. nicevillei* (Holloway, 1973; see also Yata, 1992). The *sari* subgroup of eight species is divided by Yata into two sections, the *sari* section of three species, distributed from Burma to Sundaland and the Philippines, but not on Sulawesi, and the *andersoni* complex of five species, to which the Sulawesi endemic *E. celebensis* belongs. The phylogenetic relationships of the latter complex are unresolved, but since the complex does not occur in the Philippines or the Moluccas, the only link shown is between Sulawesi and Sundaland. The *simulatrix* subgroup consists of the Sulawesi endemic *E. irena* and the widespread *E. simulatrix*. The latter species is found from Burma to Sundaland and the Philippines. From this distribution it cannot be concluded whether *E. irena* links Sulawesi to Sundaland or to the Philippines.

As pointed out by Vane-Wright (1991), the cladistic analysis of *Idea* Fabricius of Kitching *et al*. (1987), transformed into an area cladogram (Vane-Wright's fig. 3; cf. our fig. 11), leads to the conclusion that an originally Asian ancestor first spread from Sundaland to Sulawesi, where it speciated, and later again spread from Sundaland to Sulawesi, either directly or through the Philippines. After speciating again in Sulawesi, it spread to the Moluccas and hence to western New Guinea. This scenario is consistent with the geological interpretation that west Sulawesi has always been close (and until the middle Eocene connected) to Sundaland and that opportunities for exchange with

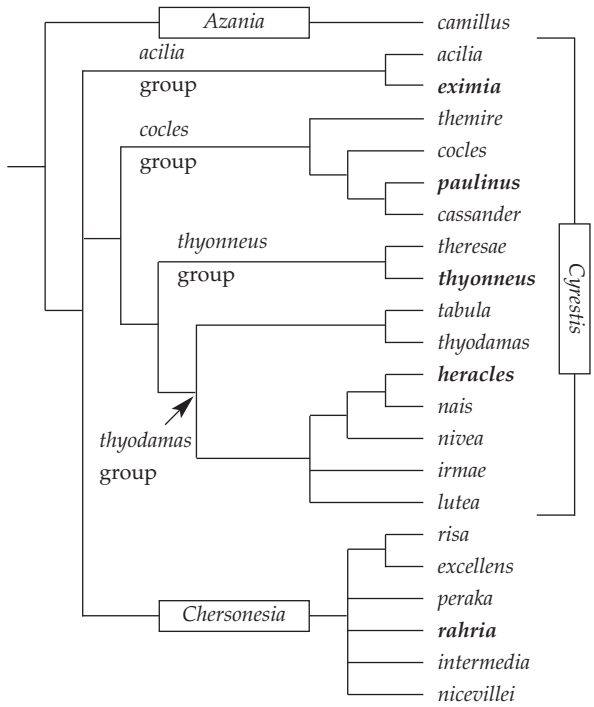

Fig. 13. Strict consensus tree of 40 equally parsimonious trees for *Cyrestis* and *Chersonesia* (Nymphalidae), based on data provided by Holloway (1973) (length 158, CI=0.671, RI=0.858, RI=0.576). Species occurring in the Sulawesi Region have been printed in bold. See text for further explanation.

the Philippines and the Moluccas only became significant in the Pliocene.

As explained by Vane-Wright (1991), the phylogenetic relationships among the eight members of the monophyletic *Parantica tityoides* group (Ackery & Vane-Wright, 1984) tell a different story (fig. 12). This group, which includes a monophyletic subgroup of four Sulawesi endemics, occurs in Sumatra, Java, Bali and Timor, but is absent from Borneo, the Philippines and the Moluccas. Unless it has become extinct in Borneo, it must have reached Sulawesi through Java and possibly the Lesser Sunda Islands. Its occurrence on Timor indicates that extinction must have occurred in most of the Lesser Sunda Islands. A link between Sulawesi and the Lesser Sunda Islands is still apparent in the monophyletic group comprising *Parantica sulewattan* (Lompobatang in south-western Sulawesi), *P. philo* (Sumbawa) and *P. wegneri* (Flores).

Smiles (1982) was aware of only one of the two endemic *Polyura* species known from Sulawesi. In his cladistic analysis, the endemic *P. cognata* emerged as sister to *P. dehanii*, found only on Sumatra and Java. In Smiles' scheme this pair form the sister taxon of the *athamas* group, seven species collectively distributed through Sri Lanka, India, southern China, SE Asia, the Philippines, Sulawesi, and the Greater and Lesser Sunda Islands, to Timor (Smiles, 1982: map 2). None of the *athamas* group species is found in N or C Maluku, New Guinea or Australia. On Sulawesi, the group is represented by the only non-endemic *Polyura* found on the island, *P. alphius* (= *agraria*).

Thus *P. cognata* appears to be of SE Asian origin, and may have evolved on Sulawesi following a vicariance event with, or dispersal from Java. The endemic species that Smiles unfortunately overlooked, *Polyura inopinatus*, is very distinctive. It is known only from the unique holotype, described from northern Sulawesi in 1939, and its place within Smiles' scheme has not been determined. *P. inopinatus* was not encountered during *Project Wallace*.

The genus *Cyrestis*, with only five species in the Sulawesi Region (of which three are endemic) is remarkable for the various biogeographic links it demonstrates. Holloway (1973) analysed the *Cyrestis* group of genera, using a distance method. We re-analysed his data matrix (p. 170), applying maximum parsimony (PAUP4b10). The strict consensus tree of the 40 equally parsimonious trees found (our fig. 13) is slightly different from Holloway's dendrogram (his fig. 10). We have used *Azania* (with *camillus* as exemplar species) to root the tree. Conspecific subspecies have been merged and the names for species groups have been added, following Tsukada (1985). If this cladogram truly reflects phylogenetic relationships, then the monophyly of *Cyrestis* is not strongly supported (in fact, in 70% of the 40 trees the *acilia* group clusters with *Chersonesia*), and recognition of a *nivea* group as does Tsukada (1985) renders the *thyodamas* group paraphyletic. However, these taxonomic problems do not affect Sulawesi relationships.

We find Sulawesi taxa in four species groups. The *acilia* group is mainly distributed in the Papuan Region, *C. strigata* (recognised as a separate species here, but considered a subspecies of *C. acilia* by Holloway, 1973) being the representative in the Sulawesi Region, while the endemic *C. eximia* of Kep. Sangihe also belongs to this group. Thus, these species show an eastern connection, but since the sister of the *acilia* group is uncertain, nothing can be said on direction of spread.

The *cocles* group demonstrates an interesting sequence of speciation events, starting with an early split between the Sundaland-continental Asian taxa *C. themire* and *C. cocles*. The next split is between *C. cocles* and a Philippines-Sulawesi-Molluccas-Vogelkop complex. This is a Sundaland connection, but it cannot be decided whether the ancestor of *C. cassander* and *C. paulinus* went from Borneo directly to Sulawesi or via the Philippines. Finally, *C. paulinus* apparently extended its range further east and reached the Vogelkop, demonstrating the Moluccan connection.

In the *thyonneus* group we find again a Sundaland connection in the sisters *C. theresae* (Sumatra and Borneo) and *C. thyonneus* (Sulawesi and C. Moluccas). The *thyodamas* group is very widespread, occurring throughout the Oriental Region, extending north to S Japan, and east to the Solomon Islands and New Caledonia. Since the earlier speciation events are between continental Asian and Sundaland taxa, the spread would seem to have been from west to east across Wallace's Line. In our area we have the *telamon* complex of species, with *C. heracles* on C and N Sulawesi and Kep. Sula, *C. telamon* in C and N Moluccas, *C. achates* in New Guinea, and additional taxa in the Bismarck and Solomon Islands. According to fig. 10, the sister of this complex is *C. nais*, an endemic of the Lesser Sunda Islands (Lombok to Timor). This suggests a southern connection, but because of the absence of *C. heracles* from the south and southeast arms of Sulawesi (as well as from the southern islands) the possibility cannot be ruled out that the route was from the Lesser Sunda Islands to the Moluccas (although now absent from S Moluccas) and from there into Sulawesi.

De Jong (1983) found an exclusive link between Sulawesi and the Philippines in

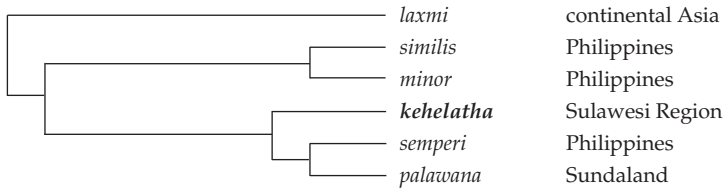

Fig. 14. Species and area cladogram for the *laxmi* group of the genus *Coladenia* (Hesperiidae), after de Jong (1996). The Sulawesi species has been printed in bold.

the sister species *Matapa celsina* (Sulawesi endemic) and *M. intermedia* (Sulawesi and the Philippines). The sister species of the two species combined is *M. sasivarna*, distributed from NE India to Sumatra and Borneo. Sister to the three species combined are the sister species *M. aria* and *M. druna*, both with a wide distribution in the Oriental Region, *M. aria* also occurring in the Philippines. Apparently, the ancestor of *M. celsina* and *M. intermedia* originally came from Borneo. Since *M. celsina* and *M. intermedia* overlap in Sulawesi, it is likely that *M. intermedia* colonized Sulawesi after speciation in the Philippines. Whether the common ancestor of the two came first to Sulawesi (in which case it indicates a link between Sulawesi and Borneo) or to the Philippines (in which case Sulawesi was twice colonized from the north) cannot be decided on the basis of present knowledge.

Links between Sulawesi and Borneo (or rather Sundaland) are also apparent in the sister species *Gangara tumpa* (Sulawesi endemic) and *G. lebadea* (Oriental Region to Java, Borneo, Palawan and Leyte) (de Jong, 1992), and *Pirdana ismene* (Sulawesi endemic) and *P. distanti* or *P. hyela* (both Sundaland, with northward extension on the continent) (de Jong & Treadaway, 1993b). A very different situation occurs in the genus *Coladenia* (de Jong, 1996). The only Sulawesi representative, *C. kehelatha*, belongs to the *laxmi* group of six species which are interrelated as in fig. 14. The Sulawesi endemic is embedded, as it were, in Philippine endemics, strongly indicating an exclusive Sulawesi-Philippines connection. From fig. 14 it also follows that at some time a Philippine species returned to Sundaland. Interesting as this may be, it does not involve Sulawesi and therefore falls outside the scope of this paper.

The genus *Taractrocera* has three species on Sulawesi: *T. ardonia*, *T. luzonensis* and *T. nigrolimbata*. All three occur in Sundaland, *luzonensis* also in the Philippines. Although they generally indicate a Sulawesi-Sundaland link, they have very different histories, and may have arrived in Sulawesi at very different times and from different directions (de Jong, 2001). The genus is of Australian origin. At some time, possibly in the Miocene, it spread to Asia, where it successively speciated into *T. luzonensis*, *T. archias* (not in Sulawesi), *T. nigrolimbata* and several other Asian species (see also Morley, 2000: fig. 9.27, for dispersal paths between Asia and Australia in the Miocene based on pollen analysis). It returned to Australia and New Guinea, leaving behind a population that eventually split into the continental Asian *T. maevis* and the Sundaland species *T. ardonia*. Since *T. ardonia* is only known from W Malaysia, Borneo and the Sulawesi Region, it would appear that it reached Sulawesi directly from Borneo. The older *T. nigrolimbata* occurs from Indo-China and Malaysia through Sumatra and Java to Sumba-

wa. It is unknown from Borneo. Therefore, a direct link between Sulawesi and the Lesser Sunda Islands seems obvious. This is strengthened by the fact that the species can be subdivided in two subspecies, the one from Sulawesi otherwise being restricted to the Lesser Sunda Islands. Finally *T. luzonensis*, the oldest Asian species of the genus, has a wide distribution, from Burma through Sundaland to the Philippines and the Sulawesi Region, but not occurring on Java or the Lesser Sunda Islands. Since it (or its ancestor) came from Australia, it may well have reached Sulawesi directly from the south-east.

Remarkably, an additional case of an originally Australian group colonizing Asia is found in the related genus *Cephrenes* (de Jong, 2001). After an early Papuan-Australian development one species reached Asia and speciated there to produce *C. acalle*. This species is widespread in the Oriental Region and also occurs in the Philippines, but not on the Lesser Sunda Islands. Since it is high in the crown of the phylogenetic tree, it is likely that it arrived in Asia much later than *Taractrocera luzonensis*. Although other species of the genus also occur in the Papuan Region, the sister species of *C. acalle*, *Cephrenes trichopepla*, is only known from N. Queensland, suggesting that the ancestor of *C. acalle* did not move to the north-west by way of New Guinea and the Moluccas. Although its route remains unclear, it is still an Australian element in the Oriental fauna, and thus in the fauna of Sulawesi. The same is probably true for the Sulawesi representatives of such eastern genera as *Psychonotis* (Lycaenidae), and possibly *Elodina* (Pieridae).

Even though the cladistic information on the butterflies of the Sulawesi Region is poor, the absence of a single pattern suggesting a single historical event to explain the butterfly diversity of the region, is obvious. This is in agreement with information on the geological history of the area. Apparently, Sulawesi (or its constituent parts) has been colonized from different directions over a period of millions of years.

Note added in press: Fric *et al.* (submitted) have made a very interesting cladistic analysis of the Palaearctic/Indian region genus *Araschnia* (Nymphalini), which they demonstrate to be the sister group of *Symbrenthia*, the latter to include the former genus *Mynes*. Within their expanded concept of *Symbrenthia*, the five Sulawesi species occupy a diverse set of relationships. The Sulawesi endemic *S. intricata* forms a basal clade, sister to all the other two dozen or more members of the genus. The 'Asian' species *S. hippoclus* and *S. lilaea*, and another Sulawesi endemic, *S. platena*, also occupy basal lineages, forming together with *intricata* and two other species a basal stem group of six. Of the two crown groups, one appears to be of New Guinea origin, as it includes only one species occurring west of Weber's line, the Sulawesi endemic *S. hippalus*. According to Fric *et al.*, this terminal taxon forms part of a terminal clade of three species formerly included in *Mynes*, and appears very good evidence of a Papuan origin for this one element of the Sulawesi fauna. The very high rank accorded *S. intricata* also suggests a relatively ancient element among the Sulawesi butterflies, comparable to stem-group species such as the danaines *Euploea magou* and *Idea tambusisana* (Ackery & Vane-Wright, 1984; Vane-Wright, 1991).

Conclusions

Both faunal and cladistic analysis point to a butterfly fauna of mainly Asian (Sundaland) origin, with no special relationship with Borneo. Generic endemism is considered low: seven genera are endemic to the Sulawesi Region, of which only one, the satyrine

Lohora, shows evidence of extensive radiation. This, coupled with the high level of species endemism, suggests a long but not excessive period of evolution in isolation, probably "seeded" in geological W Sulawesi by species derived from Asia and Sundaland. Possibly ancestors of some of these species rafted on W Sulawesi, when it separated from Borneo in the middle Eocene, and in due course speciated in isolation. The Sulawesi endemics are not evenly distributed over the island. Only 25.7% are widespread, while more than twice that number (63.6%) are restricted to the northern and central areas. This may be due to ecological rather than historical factors: the northern and, particularly, central parts of Sulawesi may offer more chances for isolation.

Since the collision of the Asian and Australian plates bringing east and west Sulawesi together, continuing faunal exchange has mainly been a one-way route: into Sulawesi. However, it also seems plausible that some taxa that evolved on Sulawesi have extended east into the Moluccas, and a few may have penetrated further east into New Guinea and even the Solomon Islands. More rarely a few others, such as *Eurema tominia*, could have spread west into Borneo. These processes seem to be continuing to the present day. For example, *Melanitis boisduvalia* appears to have arrived in northern Sulawesi from the Philippines via Talaud and Sangihe in the recent past. Similarly, *Papilio demoleus* appears to be in a very active process of range extension, from the Philippines to N Sulawesi. Sometimes (at present only demonstrable in *Idea* and *Taractrocera*) Sulawesi has been colonized more than once by the same monophyletic group at different times.

The Asian connection ran through the Philippines, Borneo and the Lesser Sunda Islands, but the faunal exchange with Sundaland has probably been mainly from the north (Philippines) and south (Java and Lesser Sundas). The first and last links are apparent as exclusive links either at the species level or at sister group level. Further indication of the importance of these links is found in the distribution of non-endemic species with restricted distribution on Sulawesi (*ca* 30% of the non-endemic species): contrary to the narrow endemics on Sulawesi, they are mainly found in the north and south, suggesting that they have not yet extended their ranges further across the island. Exclusive links with Borneo are hard to find, but this is hardly surprising as Borneo's present island state is recent (*ca* 8000 yr). The island has been connected to the mainland for much of the time since the Cretaceous. It has also intermittently been connected to Java in the Tertiary, and broadly so in the Quaternary. Not surprisingly, the faunas of Java and Borneo have much in common. In the Quaternary the lowering of the sea level during the northern Ice Ages brought Borneo relatively close to the Philippines (Palawan actually formed a northward extension of Borneo), giving the opportunity for further faunal exchange. As a consequence, most of the species that Sulawesi has in common with Borneo have a much wider distribution.

At taxonomic levels above the sister group, exclusive links between Sulawesi and the Philippines or the Lesser Sunda Islands are not apparent (e.g. there is no genus restricted to such a combination). This could be so because species invading Sulawesi belong mainly to more dispersive groups. The link that appeared last seems to be with the Moluccas. The greater part of the genera and species on Sulawesi are widespread around the island, but do not occur in the Moluccas. The Moluccan link is only apparent in the distribution of a number of species, not even at the species group level. This agrees with the young age of the Moluccas: the

islands emerged not longer ago than 5 Ma. When they rose out of the sea they were obviously devoid of butterflies, offering some Sulawesi species the opportunity to spread eastward and eventually to reach Irian Jaya. The genus *Acrophtalmia* is a good example of this that also exhibits the Philippine link: this very distinct genus is restricted to the Philippines (not Palawan), Sulawesi, Moluccas, and the Arfak Mountains in Irian Jaya. Since the population in the Arfak Mountains appears conspecific with the Moluccan population, a recent eastward spread rather than a westward one is clearly suggested.

The almost complete lack of any distinctly eastern taxa on Sulawesi could be explained by the strong possibility that eastern Sulawesi was completely submerged up until the suture event, and thus did not act as a "raft" for eastern taxa. Yet in two genera of Hesperiidae (*Taractrocera* and *Cephrenes*) an Australian origin is recognizable. In both cases the Moluccas are not involved and it is very likely that the dispersion occurred before the Moluccas became subaerial. Although further phylogenetic analysis may reveal more such cases, it cannot be accidental that *Taractrocera* lives on grasses and some species can even be found on the beach, while *Cephrenes* lives on palms, such as coco that can also be found on beaches. Both taxa are thus potentially good colonizers.

Annotated checklist

Lepidoptera Linnaeus, 1758
(butterflies and moths)

This major insect order contains in the order of 200,000 species (Heppner, 1991), divided amongst four suborders (Zeugloptera, Aglossata, Heterobathmiina, Glossata). The Lepidoptera occur in all terrestrial regions of the earth (except the Antarctic continent and extreme Arctic), and appear to have evolved at least as early as the Mesozoic. Their biology is dominated by the ecology of the early stages (mainly feeding on or within plant tissues), and the mate-location strategies and dispersal abilities of the adults.

Key works.— Common (1970), Barlow (1982), Whalley (1986), Holloway *et al.* (1987, 2001), Stehr (1987), Nielsen (1989), Common (1990), Nielsen & Common (1991), Scoble (1992), Robinson *et al.* (1994, 2001), Kristensen (1999), Pitkin 2002 (website).

Rhopalocera Boisduval, 1840
(butterflies)

The butterflies, which include about 17,500-20,000 species (Ackery *et al.*, 1999), belong to the Ditrysia, a major subgroup of the Glossata. The two major subgroups, superfamilies Hesperioidea (with the single family Hesperiidae) and Papilionoidea, are cosmopolitan and well-represented in the Sulawesi Region. A third group, the Hedyloidea (which include about 40 known species, all restricted to the New World), may or may not represent the closest relatives of the butterflies or even be internal to the group (Scoble, 1986; Weller & Pashley, 1995; de Jong *et al.*, 1996). The oldest known fossil considered to be a hesperioid butterfly is from the Upper Paleocene (Kristensen & Skalski, 1999). Butterfly diversification is generally considered to have come about through co-evolution with flowering plants, or more probably by adapti-

ve radiation onto flowering plants, coupled with geographical isolation. Mate location in butterflies is typically initiated by visually guided male activity (in contrast to moths, in which mate location is normally initiated by controlled release of female pheromones).

Key general works on butterflies: Ehrlich (1958), Ehrlich & Raven (1965), Hemming (1967), Kristensen (1976), Vane-Wright (1978), Scott (1986), Scoble (1986, 1990, 1992), Bridges (1988c), Nielsen (1989), Vane-Wright & Ackery (1989), Shields (1989a), Scoble & Aiello (1990), Weller & Pashley (1995), de Jong *et al.* (1996), Ackery *et al.* (1999).

Key works for South East Asian and Australasian butterflies:

SE Asia:	d'Abrera (1982, 1985, 1986), Aoki *et al.* (1982), Morishita (1981), Tsukada & Nishiyama (1982), Tsukada (1985, 1991), Yata (1981a);
Hong Kong:	Bascombe *et al.* (1999);
Taiwan:	Shirôzu (1960);
Laos:	Motono & Negishi (1989), Osada *et al.* (1999);
Thailand:	Pinratana (1974-1985), Pinratana & Eliot (1996);
W Malaysia:	Corbet & Pendlebury (1992);
Borneo:	Cassidy (1985), Otsuka (1988, 1991), Seki *et al.* (1991), Maruyama (1991);
Sumatra:	de Nicéville & Martin (1896);
Java:	Roepke (1935-1942);
Sulawesi:	Martin (1914-1929);
Philippines:	Treadaway (1995);
Papua New Guinea:	Parsons (1999);
Solomon Islands:	Tennent (2002);
New Caledonia:	Holloway & Peters (1976);
Australia:	Common & Waterhouse (1981), Braby (2000), Dunn & Dunn (1991).

For the early stages and life histories, the works of Igarashi & Fukuda (1997, 2000) represent a remarkable resource. Chou (1990, 1998) provides illustrations of all Chinese butterflies, many of which are Oriental in distribution. The series on Chinese butterflies produced by Satoshi Koiwaya (e.g. 1996) is another remarkable source of information on life histories. Ackery *et al.* (1995; see also d'Abrera, 1980) provide a catalogue of the butterflies of the Afrotropical Region, which is undoubtedly the most similar major region to Indo-Australia in terms of its butterfly fauna.

Hesperiidae Latreille, 1809
(skippers)

Range.— Cosmopolitan, but not occurring in New Zealand; about 3500 species; one family, divided into six subfamilies, three of which are represented in the Sulawesi Region.

Foodplants.— A wide variety of angiosperms.

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Plate 1

Plate 1. Hesperiidae (Figs 1-4, Coeliadinae; Figs 5-13, Pyrginae). **1**: *Burara aphrodite* Fruhstorfer (male, underside), Kep. Sula (Mangole, x.1897, *W. Doherty*, Rothschild Bequest). **2**: *Hasora mixta fenestrata* Fruhstorfer (male), Kep. Banggai (1904, ex *J. Waterstradt*, R. Oberthür Coll.). **3**: *Badamia exclamationis* Fabricius (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **4**: *Choaspes plateni plateni* Staudinger (male), Sulawesi (ix-x, *Van der Poll*, H. J. Adams Bequest). **5**: *Celaenorrhinus ficulnea tola* Hewitson (male), Sulawesi (ix-x, *Van der Poll*, H. J. Adams Bequest). **6**: *Celaenorrhinus asmara palajava* Staudinger (male), Sulawesi (Ujung Pandang, ? ex Swinhoe Coll.). **7**: *Odina chrysomelaena* Mabille (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **8**: *Pseudocoladenia dan eacus* Latreille (male), Sulawesi (Mt G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, R. Oberthür Coll.). **9**: *Coladenia kehelatha* Hewitson (male), Sulawesi (Palu, Biromaroe, sea level, x.1936, *J. P. A. Kalis*, Rothschild Bequest). **10**: *Gerosis celebica celebica* Felder & Felder (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **11**: *Tagiades trebellius trebellius* Hopffer (male), Sulawesi (Palu, Kintabaroe, 600 ft, xi.1936, *J. P. A. Kalis*, Rothschild Bequest). **12**: *Odontoptilum angulatum helias* Felder & Felder (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **13**: *Caprona agama agama* Moore (male), Sulawesi (J. J. Joicey Coll.).

Plate 2

Plate 3

Plate 4

Plate 5

Plate 6

Plate 7


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Plate 8

Plate 9

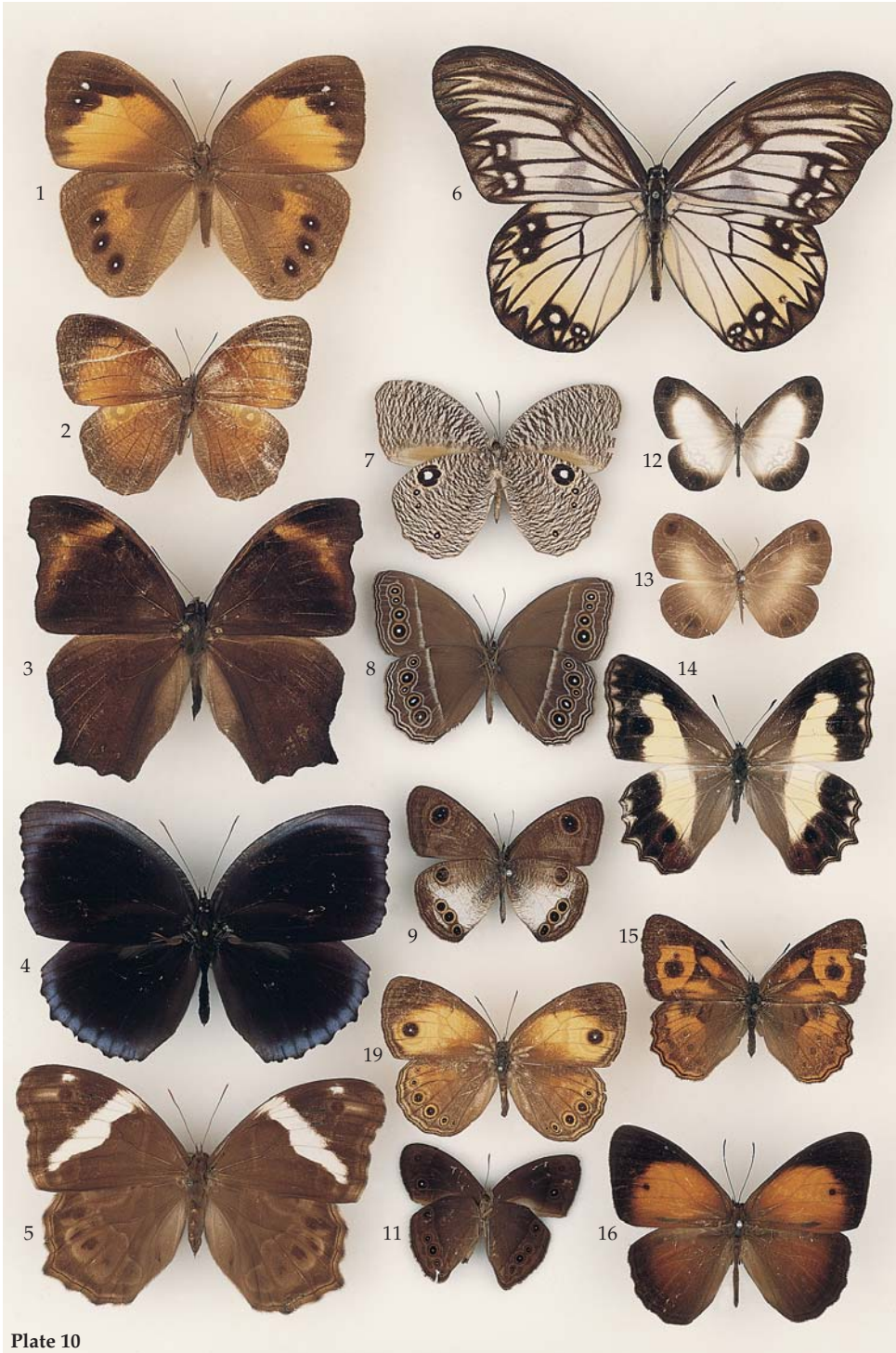

Plate 10

Plate 11

Plate 12

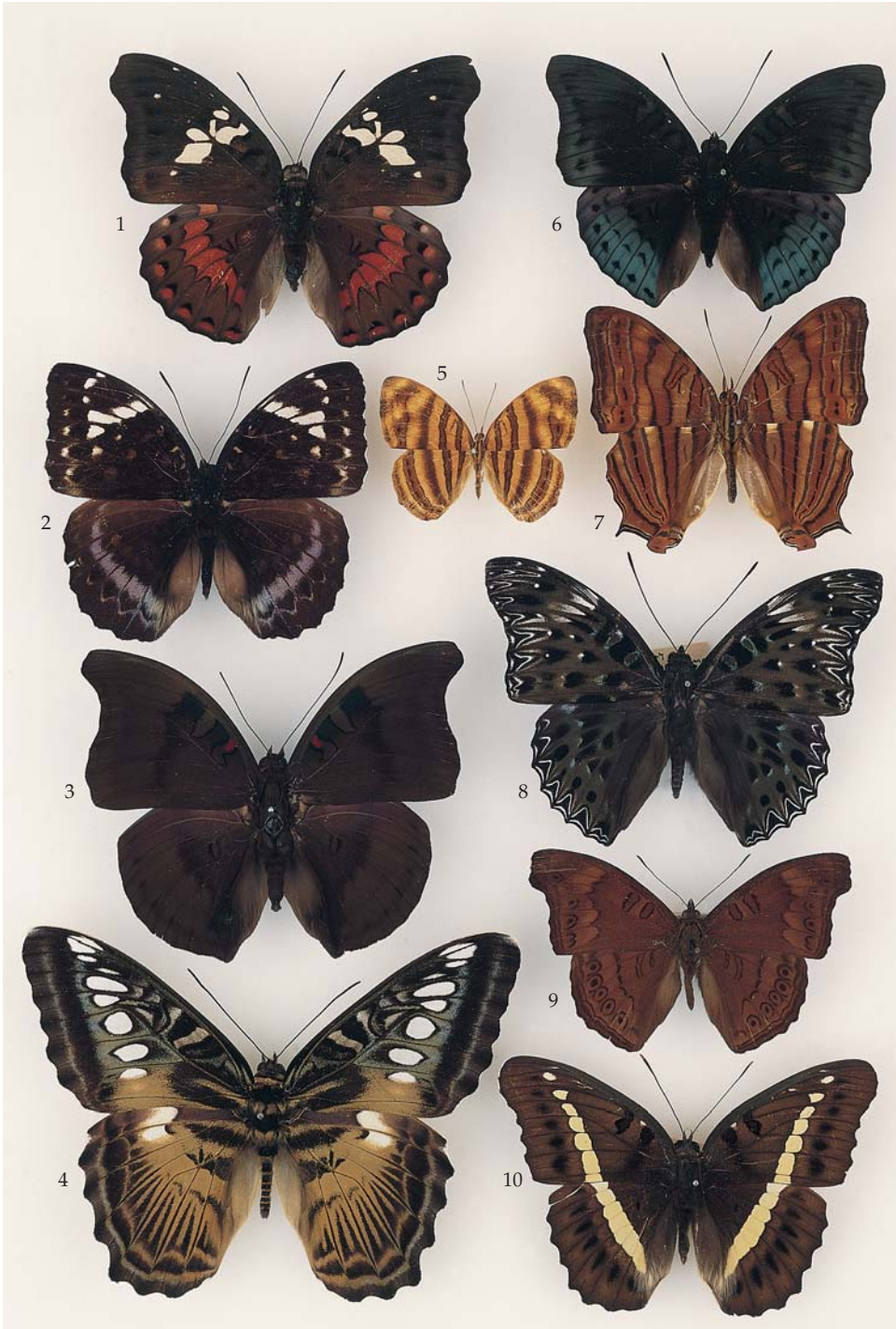

Plate 13

Plate 14

Plate 15

Plate 16

Plate 2. Hesperiidae (Figs 1-25, Hesperiinae). **1**: *Halpe beturia* Hewitson (male), Sulawesi (between Maros and Tjamba, 1896, *W. Doherty*, R. Oberthür Coll.). **2**: *Psolos fuligo fuscula* Snellen (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **3**: *Ancistroides longicornis* Butler (female, *teste* Evans), Sulawesi (Manado, ex Hamilton Druce, J. J. Joicey Coll.). **4**: *Notocrypta paralysos volux* Mabille (male), Philippines (Mindanao, 1903-1904, *J. Waterstradt*, R. Oberthür Coll.) [NOTE: *N. paralysos yaya* Fruhstorfer, the subspecies found in the Sulawesi Region and Maluku, has a much narrower forewing band]. **5**: *Cupitha purreea* Moore (female), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, R. Oberthür Coll.). **6**: *Zographetus abima* Hewitson (female), Sulawesi (between Maros & Tjamba, 1896, *W. Doherty*, R. Oberthür Coll.). **7**: *Plastingia tessellata tessellata* Hewitson (female, underside), Sulawesi (? Jawangan, 1903, *Rolle*, R. Oberthür Coll.). **8**: *Lotongus calathus taprobanus* Plötz (female), Sulawesi (Tombugu, 1885, *H. Kühn*, Godman & Salvin Coll.). **9**: *Gangara thyrsis* Fabricius (male, underside), Sulawesi (R. Oberthür Coll.). **10**: *Erionota hiraca sakita* Ribbe (female), Sulawesi (Tombugu, 1885, *C. Ribbe*, Godman & Salvin Coll.). **11**: *Ilma irvina* Plötz (female), Sulawesi (E. Sulawesi, Crowley Bequest). **12**: *Matapa celsina* Felder & Felder (male), Sulawesi (Tombugu, 1885, *H. Kühn*, R. Oberthür Coll.). **13**: *Acerbas azona* Hewitson (male), Sulawesi (S. Sulawesi, viii-ix.1991, *W. Doherty*, W. H. Evans Coll.). **14**: *Pirdana ismene* Hewitson (male), Sulawesi (Minahassa, ex P. Mabille, R. Oberthür Coll.). **15**: *Taractrocera nigrolimbata talantus* Plötz (male), Sulawesi (Samanga, xi.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **16**: *Oriens alfurus* Plötz (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, ex Oberthür Coll.). **17**: *Potanthus fettingi nikaja* Fruhstorfer (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, R. Oberthür). **18**: *Telicota ternatensis testa* Evans (male), Sulawesi (between Maros and Tjamba, 1896, *W. Doherty*, R. Oberthür Coll.). **19**: *Cephrenes augiades augiades* Felder & Felder (male), Sulawesi (Mt Mata, ix.1998, *A.E.*, Crowley Bequest). **20**: *Prusiana kuehni* Plötz (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **21**: *Parnara kawazoei* Chiba & Eliot (male), "Philippines" (1916, ex Swinhoe, J. J. Joicey Coll.). **22**: *Borbo bevani* Moore (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, R. Oberthür Coll.). **23**: *Pelopidas agna agna* Moore (male), Sulawesi (Toli Toli, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest). **24**: *Polytremis lubricans lubricans* Herrich-Schäffer (male), Sulawesi (between Maros and Tjamba, 1896, *W. Doherty*, R. Oberthür Coll.). **25**: *Caltoris mehavagga* Fruhstorfer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.).

Plate 3. Papilionidae (Figs 1-8, Papilioninae, Troidini). **1**: *Troides (Troides) hypolitus cellularis* Rothschild (female), Sulawesi (Gorontalo, 1896, *A. W. Mucks*, J. J. Joicey Coll.). **2**: *Pachliopta polyphontes polyphontes* Boisduval (male), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **3**: *Atrophaneura dixoni* Grose-Smith (male), Sulawesi (Palopo, 8.vi.1975, *C. G. Treadaway*). **4**: the same (holotype female), Sulawesi (N. Sulawesi, Bhool, *F. Dixon*, ex Grose-Smith, J. J. Joicey Coll.). **5**: *Troides (Troides) helena hephaestus* Felder & Felder (male), Sulawesi (Tondano, Fruhstorfer Coll.). **6**: *Losaria palu* Martin (male), Sulawesi (Palu, 14.iv.1983, ex D. L. Hancock). **7**: *Atrophaneura kuehni kuehni* Honrath (male syntype), Sulawesi (Tombugu, 1885, *H. Kühn*, H. J. Adams Bequest). **8**: *Atrophaneura kuehni mesolamprus* Rothschild (female), Sulawesi (Toli Toli, xi-xii.1895, *H. Fruhstorfer*, H. Fruhstorfer Coll.).

Plate 4. Papilionidae (Figs 1-8, Papilioninae, Papilionini). **1**: *Papilio (Menelaides) ascalaphus ascalaphus* Boisduval (female), Sulawesi (N. Sulawesi, Djiko Malobok, Bolaang Magondouw, 10.2.1927, *Braekel*, J. J. Joicey Coll.). **2**: *Chilasa (Chilasa) veiovis* Hewitson (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **3**: *Papilio (Menelaides) jordani* Fruhstorfer (male), Sulawesi (N. Sulawesi, Djiko Malobok, Bolaang Magondouw, 25.vii.1927, *Braekel*, J. J. Joicey Coll.). **4**: the same (female), Sulawesi (N. Sulawesi, ex Niepelt, ex Joicey, H. M. Peebles Coll.). **5**: *Papilio (Achillides) blumei blumei* Boisduval (male), Sulawesi (Tenggari, 1898, C. Oberthür Coll.). **6**: *Papilio (Menelaides) sataspes sataspes* Felder & Felder (female), Sulawesi (Tondano, Fruhstorfer Coll.). **7**: *Papilio (Menelaides) gigon gigon* Felder & Felder (male), Sulawesi (Gorontalo, 1896, *A. W. Mucks*, P. I. Lathy Coll.). **8**: *Papilio (Achillides) peranthus insulicola* Rothschild (male), Sulawesi (between Maros and Tjamba, 1898, *W. Doherty*, C. Oberthür Coll.).

Plate 5. Papilionidae (Figs 1-7, Papilioninae, Leptocircini). **1**: *Graphium (Paranticopsis) deucalion deucalion* Boisduval (male), Sulawesi (Tondano, 9.10.1899, R. E. Turner Coll.). **2**: *Graphium (Graphium) meyeri* Hopffer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **3**: *Graphium*

(Graphium) agamemnon comodus Fruhstorfer (male), Sulawesi (Tonsea Lama, 29.iii.1920, ex Zoological Museum Buitenzorg). **4**: *Graphium (Graphium) monticolus* Fruhstorfer (male), Sulawesi (Bua-Kraeng, 5000', ii.1896, *H. Fruhstorfer*, Fruhstorfer Coll.). **5**: *Graphium (Pathysa) dorcus dorcus* de Haan (male), Sulawesi (no data, ?ex Honrath, H. J. Adams Bequest). **6**: *Graphium (Graphium) codrus celebensis* Wallace (male), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest). **7**: *Lamproptera meges akirai* Tsukada & Nishiyama (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.).

Plate 6. Pieridae (Figs 2, 6, 14, Coliadinae; Figs 1, 3-5, 7-13, Pierinae). **1**: *Pareronia tritaea bargylia* Fruhstorfer (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **2**: *Eurema (Terias) tominia tominia* Vollenhoven (male), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest). **3**: *Aoa affinis* Vollenhoven (female), Sulawesi (Tondano, J. J. Joicey Coll.). **4**: *Ixias paluensis* Martin (male), Sulawesi (Palu, 15.vii.1912, *L. Martin*, Rothschild Bequest). **5**: *Hebomoia glaucippe celebensis* Wallace (female), Sulawesi (N. Sulawesi, xi-xii.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **6**: *Gandaca butyrosa samanga* Fruhstorfer (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **7**: *Belenois java java* Sparrman (male), Sulawesi (Palu, 14.iii.1912, *L. Martin*). **8**: *Elodina sota* Eliot (female paratype), Sulawesi (S. Sulawesi, Malino, 3000 ft, 9.iv.1937, *J. N. Eliot*). **9**: *Leptosia lignea* Vollenhoven (male), Sulawesi (Palu, 2.vi.1912, *L. Martin*, Rothschild Bequest). **10**: *Delias benasu* Martin (female), Sulawesi (C. Sulawesi, 1500m, 14.xi.1979, pres. C. G. Treadaway). **11**: *Cepora timnatha filia* Fruhstorfer (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, R. Oberthür Coll.). **12**: *Saletara panda nigerrima* Holland (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **13**: *Appias (Catophaga)* new species (= *nero zarinda* ab. *aurosa* Fruhstorfer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, R. Oberthür Coll.). **14**: *Catopsilia pomona flava* Butler (female), Sulawesi (Minahassa, Tanggari, 1898, *Van der Poll*, J. J. Joicey Coll.).

Plate 7. Lycaenidae (Fig. 1, Poritiinae; Figs 2-5, Miletinae; Fig. 6, Curetinae; Figs 7-25, Theclinae). **1**: *Deramas nigrescens* Eliot (male holotype), Sulawesi (Tawaya, north of Palos Bay, viii-ix.1896, *W. Doherty*, Rothschild Bequest). **2**: *Allotinus (Paragerydus) albatus albatus* Felder & Felder (female), Sulawesi (Dumoga-Bone National Park, 1000 m, iii.1985, *J. D. Holloway*, Project Wallace Expedition). **3**: *Logania obscura* Röber (male), Sulawesi (Tombugu, 1885, *H. Kühn*, C. Oberthür Coll.). **4**: *Miletus leos maximus* Holland (female), Sulawesi (S. Sulawesi, Pawnuang, i.1896, *H. Fruhstorfer*, Fruhstorfer Coll.). **5**: *Spalgis epius titius* Fruhstorfer (male), Java (E. Java, Malang, ix.1928, *E. Overdijkink*, J. J. Joicey Coll.). **6**: *Curetis tagalica celebensis* Felder & Felder (male), Sulawesi (G. Lompobatang, 1885, *C. Ribbe*, Godman-Salvin Coll.). **7**: *Arhopala eridanus elfeta* Hewitson (female), Kep. Sula (Mangole, 1894, *Platen*, Rothschild Bequest). **8**: *Flos apidanus palawanus* Staudinger (female), Philippines (Palawan, Rothschild Bequest). **9**: *Surendra vivarna samina* Fruhstorfer (female), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest). **10**: *Amblypodia narada confusa* Riley (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, J. J. Joicey Coll.). **11**: *Iraota rochana johnsoniana* Holland (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **12**: *Hypothecla honos* de Nicéville (female), Sulawesi (Toli-Toli, W. H. Evans Coll.). **13**: *Loxura atymnus sulawesiensis* Takanami (male), Sulawesi (Ujung Pandang, *A. R. Wallace*, Godman-Salvin Coll.). **14**: *Horaga selina* Grose-Smith (female, underside), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **15**: *Drupadia theda thaliarchus* Staudinger (female), Sulawesi (Minahassa, ex Staudinger, Godman-Salvin Coll.). **16**: *Tajuria cyrillus* Hewitson (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **17**: *Rachana jalindra tarpina* Hewitson (male), Andaman Islands (S. Andamans, 6.vi.1924, *M. L. Ferrer*). **18**: *Dacalana anysis* Hewitson (male), Sulawesi (Minahassa, ex Staudinger, Godman-Salvin Coll.). **19**: *Remelana jangala orsolina* Hewitson (male), Sulawesi (Minahassa, ex Staudinger, Godman-Salvin Coll.). **20**: *Hypolycaena sipylus giscon* Fruhstorfer (male), Sulawesi (Birumaru, Palu, sea-level, x.1936, *J. P. A. Kalis*, Rothschild Bequest). **21**: *Bindahara phocides fumata* Röber (female, underside), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **22**: *Rapala zylda* Seitz (female holotype), Lutungan Island ([nr Toli-Toli, Sulawesi], xii.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **23**: *Deudorix epijarbas megakles* Fruhstorfer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **24**: *Artipe eryx alax* Eliot (male holotype), Sulawesi (Malino, 3500 ft, 12.iv.1937, *J. N. Eliot*). **25**: *Sinthusa verriculata* Snellen (male syntype of *S. verena* Grose-Smith), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest).

Plate 8. Lycaenidae (Figs 1-35, Polyommatinae); Riodinidae (Figs 36-37). **1**: *Anthene licates licates* Hewitson (male), Sulawesi (Sg. Maros, 23.iii.1937, *J. N. Eliot*). **2**: *Una usta usta* Distant (male, underside), Malaysia (Penang Hills, 30.x.1956, *M. J. V. Miller*, M. J. V. Miller Coll.). **3**: *Petrelaea* sp. (male, underside), Malaysia (Mt Tahan, *Waterstradt*, Rothschild Bequest). **4**: *Nacaduba berenice eliana* Fruhstorfer (male, underside), Sulawesi (Maros, ix.1923, *C. J. Brooks*, C. J. Brooks Bequest). **5**: *Nacaduba angusta pamela* Grose-Smith (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **6**: *Prosotas nora nora* Felder (male, underside), Sulawesi (between Maros and Tjamba, 1896, *W. Doherty*, C. Oberthür Coll.). **7**: *Ionolyce helicon helicon* Felder (male, underside), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **8**: *Catopyrops ancyra subfestivus* Röber (male, underside), Sulawesi (G. Lompobatang, 3000 ft, iii.1896, *H. Fruhstorfer*, Fruhstorfer Coll.). **9**: *Discolampa ilissus ilissus* Felder (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **10**: *Caleta caleta caleta* Hewitson (male), Sulawesi (Dumoga-Bone National Park, ca 1200 m, 25.iii.1985, *A. Cassidy*, Project Wallace Expedition). **11**: the same (underside), 22.iii.1985. **12**: *Psychonotis piepersii* Snellen (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **13**: *Nothodanis schaeffera schaeffera* Erschoff (male, underside), Sulawesi (Minahassa, ex Staudinger, Godman-Salvin Coll.). **14**: *Jamides aratus lunata* de Nicéville (male), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **15**: *Catochrysops strabobinna* Swinhoe (male, underside), Sulawesi (Samanga, xi.1895, *H. Fruhstorfer*, Fruhstorfer Coll.). **16**: *Lampides boeticus* Linnaeus (female), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **17**: *Leptotes plinius plutarchus* Fruhstorfer (male, underside), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **18**: *Castalius fasciatus adorabilis* Fruhstorfer (male), Sulawesi (Dumoga-Bone National Park, Hog's Back Ridge, 6.ii.1985, *J. D. Holloway*, Project Wallace Expedition). **19**: the same (female, underside). **20**: *Zizeeria karsandra karsandra* Moore (male, underside), Kep. Tukangbesi (Tomia, xii.1901, *H. Kühn*, Rothschild Bequest). **21**: *Zizina otis* Fabricius, subsp. (male, underside), Sulawesi (G. Lompobatang, 3000 ft, iii.1896, *H. Fruhstorfer*, Fruhstorfer Coll.). **22**: *Famegana alsulus lulu* Mathew (male, underside), Vulcan Island (xi.1913-i.1914, *A. S. Meek*, Rothschild Bequest). **23**: *Zizula hylax hylax* Fabricius (male, underside), Sulawesi (Manado, 1896, *W. Doherty*, C. Oberthür Coll.). **24**: *Everes lacturnus* Godart, subsp. (male, underside), Sulawesi (G. Rangkoenau, 900 ft, xi.1936, *J. P. A. Kalis*, Rothschild Bequest). **25**: *Pithecops phoenix* Röber (male, underside), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **26**: *Megisba malaya sikkima* Moore (male, underside), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **27**: *Sancterila deliciosa* Pagenstecher (female paratype of *S. sohmai* Eliot & Kawazoé), Sulawesi (G. Osing, nr Pulu Pulu, 2000-2100 m, 31.vii.1980, *S. Inou*J). **28**: *Udara camenae euphon* Fruhstorfer (male), Sulawesi (Pulu Pulu, 7.i.1981, *K. Sohma*). **29**: *Acytolepis samanga* Fruhstorfer (female), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **30**: *Celastrina philippina gradeniga* Fruhstorfer (male, underside), Sulawesi (Tombugu, 1882, *C. Ribbe*, Fruhstorfer Coll.). **31**: *Uranobothria tsukadai* Eliot & Kawazoé (male paratype, underside), Sulawesi (nr Pulu Pulu, Parado, 2300 m, 1-15.vi.1980). **32**: *Monodontides kolari* Ribbe (male, underside), Sulawesi (Punchak, Palopo, 1975). **33**: *Euchrysops cnejus* Fabricius, subsp. (male, underside), Sulawesi (Kintabaru, Palu, 600 ft, xi.1936, *J. P. A. Kalis*, Rothschild Bequest). **34**: *Chilades boopis boopis* Fruhstorfer (male, underside), Sulawesi (G. Rangkoenau, Palu, 900 ft, xi.1936, *J. P. A. Kalis*, Rothschild Bequest). **35**: *Freyeria putli* Kollar (male, underside), Bali (Gilimanoek, sea-level, v.1935, *J. P. A. Kalis*, Rothschild Bequest). **36**: *Zemeros flegyas celebensis* Fruhstorfer (male), Sulawesi (Tombugu, 1882, *C. Ribbe*). **37**: *Abisara kausambi sabina* Stichel (female), Sulawesi (Tondano, 9-10.1899, ex Van der Poll, J. J. Joicey Coll.).

Plate 9. Nymphalidae (Figs 1-7, Morphinae). **1**: *Amathusia (Pseudamathusia) virgata thoanthea* Fruhstorfer (male), Sulawesi (Tombugu, 1882, *C. Ribbe*, Godman-Salvin Coll.). **2**: *Amathuxidia plateni plateni* Staudinger (male), Sulawesi (Dumoga-Bone National Park, in banana trap by Sg. Tumpah, 2.viii.1985, Project Wallace Expedition). **3**: the same (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **4**: *Amathusia (Amathusia) phidippus celebensis* Fruhstorfer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **5**: *Discophora bambusae bambusae* Felder & Felder (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **6**: the same (male), Sulawesi (Tanggari, Minahassa, 2.ix.1898, C. Oberthür Coll.). **7**: *Faunis menado menado* Hewitson (male), Sulawesi (C. Oberthür Coll.).

Plate 10. Nymphalidae (Figs 1-16, Satyrinae). **1**: *Bletogona mycalesis mycalesis* Felder & Felder (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **2**: *Bletogona inexspectata* Uémura (female), Sulawesi (Kintabaru, Palu, 200m, x.1936, *J. P. A. Kalis*, W. K. J. Roepke Coll, Rijksmueum Leiden). **3**: *Melanitis boisduvalia ernita* Fruhstorfer (male), Sulawesi (Dumoga-Bone National Park, confluence of Sg. Toraut and Sg. Tumpah, in banana trap, 23.vi.85, *R. L. Smiles*, Project Wallace Expedition). **4**: *Elymnias cumaea cumaea* Felder & Felder (male), Sulawesi (Toli-Toli, xi-xii.1895, *H Fruhstorfer*). **5**: *Lethe europa arcuata* Butler (female), Sulawesi (Tondano, 9-10.1899, C. Oberthür Coll.). **6**: *Zethera incerta* Hewitson (male), Sualwesi (Tanggari, Minahassa, 2.ix.1898, C. Oberthür Coll.). **7**: *Bletogona inexspectata* Uémura (male, underside), Sulawesi (Kintabaru, Palu, 600 ft, xi.1936, *J. P. A. Kalis*, W. K. J. Roepke Coll., Rijksmuseum Leiden). **8**: *Orsotriaena jopas jopas* Hewitson (male, underside), Sulawesi (Manado, ex Museum of Zoology, Cambridge, G. T. Bethune-Baker Coll.). **9**: *Ypthima (Ypthima) gavalisi* Martin (male, underside), Sulawesi (Palu, 3000 ft, 9.xi.1912, *L. Martin*). **10**: *Mycalesis itys remulina* Fruhstorfer (female syntype), Suawesi (G. Lompobatang, 3000 ft, iii.1896, *H. Fruhstorfer*, Fruhstorfer Coll.). **11**: *Mycalesis mynois* Hewitson, subsp. (male, underside), Sulawesi (S. Sulawesi, Malino-goa, 1100 m, vi.1938, *van Groenendael*, ITZ Amsterdam). **12**: *Acrophtalmia windorum* Miller & Miller (male), Sulawesi (Dumoga-Bone National Park, Hog's Back Ridge, i.1985, *J. D. Holloway*, Project Wallace Expedition). **13**: *Acrophtalmia leuce chionides* de Nicéville (female), Kep. Sula (vi-ix.1918, *W. J. C. Frost*, Joicey Coll.). **14**: *Nirvanopsis hypnus* Tsukada & Nishiyama (female paratype), Sulawesi (Traja Parado, 2300 m, viii.1979, Zoologische Staatssammlung München). **15**: *Lohora (Pseudomycalesis) tanuki* Tsukada & Nishiyama (female), Sulawesi (Parado, 2300 m, 24.x.1980, *Koiwaya*, Zoologische Staatssammlung München). **16**: *Lohora (Physcon) imitatrix* Martin (male holotype), Sulawesi (N.W. Sulawesi, Riou, viii.1912, *L. Martin*, Zoologische Staatssammlung München).

Plate 11. Nymphalidae (Figs 1-2, Charaxinae; Figs 3-8, Heliconiinae). **1**: *Charaxes bernardus repetitius* Butler (male), Sulawesi (N. Sulawesi, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest). **2**: *Polyura cognata cognata* Vollenhoven (male), Sulawesi (Manado, 1906). **3**: *Acraea moluccana dohertyi* Holland (female), Sulawesi (S. Sulawesi, Mongoloe, 5.ix.06, *L. Martin*). **4**: *Cethosia biblis picta* Felder & Felder (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **5**: *Terinos taxiles poros* Fruhstorfer (male), Sulawesi, Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **6**: *Vindula erota banta* Eliot (female), Sulawesi (Djiko Malobok, Bolaang Magondouw, 100m, 20.iii.1928, *C. van Braekel*, J. J. Joicey Coll.). **7**: *Cupha arias celebensis* Fruhstorfer (female), Sulawesi (Dongala, south of Palos Bay, viii-ix.1896, *W. Doherty*, Rothschild Bequest). **8**: *Algia satyrina satyrina* Felder & Felder (female), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*, Rothschild Bequest).

Plate 12. Nymphalidae (Figs 1-5, Heliconiinae; Figs 6-12, Biblidinae). **1**: *Cirrochroa thule* Felder & Felder (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **2**: *Vagrans sinha nupta* Staudinger (male), Sulawesi (Tondano, 9.10.1899, ex Van de Poll, Adams Bequest). **3**: *Phalanta alcippe celebensis* Wallace (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **4**: *Argyreus hyperbius javanica* Oberthür (male), Bali (Kintamani, 4000 ft., ii-iii.1911, *E. Stresemann*, Rothschild Bequest). **5**: the same (female). **6**: *Pantoporia antara antara* Moore (male), Sulawesi (Manado, 2.ix.1897, G. T. Bethune-Baker Coll.). **7**: *Lasippa neriphus tawayana* Fruhstorfer (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **8**: *Neptis celebica celebica* Moore (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **9**: *Neptis ida celebensis* Hopffer (male), Sulawesi (Manado, G. T. Bethune-Baker Coll.). **10**: *Ariadne celebensis celebensis* Holland (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **11**: *Ariadne merionoides merionoides* Holland (male), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.). **12**: *Laringa castelnaui* Felder & Felder, subsp. (male), Sulawesi (Palu, G. Rangkoenau, 900 ft, xi.1936, *J. P. A. Kalis*, Rothschild Bequest).

Plate 13. Nymphalidae (Figs 1-10, Biblidinae). **1**: *Euthalia amanda amanda* Hewitson (female), Sulawesi (Manado, Rothschild Bequest). **2**: *Lexias aeetes aeetes* Hewitson (male), Sulawesi (Minahassa, G. Talbot Coll.). **3**: *Dophla evelina dermoides* Rothschild (male), Sulawesi (Minahassa, ex Staudinger 1887, C.

Oberthür Coll.). **4**: *Parthenos sylvia saltentia* Hopffer (male), Sulawesi (Tondano, 7-8.1899, C. Oberthür Coll.). **5**: *Chersonesia rahria celebensis* Rothschild (female), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **6**: *Euthalia amanda amanda* Hewitson (male), Sulawesi (N. Sulawesi, ex Janson 1906, C. Oberthür Coll.). **7**: *Cyrestis thyonneus celebensis* Staudinger (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **8**: *Dichorragia nesimachus pelurius* Fruhstorfer (male), Sulawesi (Manado, Tonsea Lama, 5.4.1927, *Braekel*, J. J. Joicey Coll.). **9**: *Pseudergolis avesta toalarum* Fruhstorfer (male), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **10**: *Bassarona labotas* Hewitson (male), Sulawesi (N. Sulawesi, *C. van Braeckel*, J. J. Joicey Coll.).

Plate 14. Nymphalidae (Figs 1, 5, Biblidinae; Figs 2-4, 6-12, Nymphalinae). **1**: *Tacola eulimene badoura* Butler (male), Sulawesi (Minahassa, G. Talbot Coll.). **2**: *Doleschallia polibete celebensis* Fruhstorfer (male), Sulawesi (Tondano, 3-4.1899, G. T. Bethune-Baker Coll.). **3**: *Kaniska canace maniliana* (male), Borneo (Mt Kinabalu, 5-8.1903, *J. Waterstradt*, C. Oberthür Coll.). **4**: *Junonia erigone gardineri* Fruhstorfer (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **5**: *Athyma libnites libnites* Hewitson (male), Sulawesi (Tondano, 3-4.1899, C. Oberthür Coll.). **6**: *Symbrenthia intricata* Fruhstorfer (male syntype), Sulawesi (Toli-Toli, xi-xii.1895, *H. Fruhstorfer*). **7**: *Symbrenthia hippalus* Felder & Felder (male), Sulawesi (N. Sulawesi, Rothschild Bequest). **8**: *Yoma sabina nimbus* Tsukada (male), Sulawesi (Kalawara, 6.vi.1912, *L. Martin*). **9**: *Rhinopalpa polynice megalonice* Felder & Felder (male, underside), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest). **10**: *Vanessa buana* Fruhstorfer (male), Sulawesi (G. Lompobatang, 5000-7000 ft, x.1895, *A. Everett*, Rothschild Bequest). **11**: *Symbrenthia hippalus* Felder & Felder (female), Sulawesi (N. Sulawesi, *C. Hose*, Rothschild Bequest). **12**: *Hypolimnas anomala stellata* Fruhstorfer (male), Sulawesi (S. Sulawesi, viii-ix.1891, *W. Doherty*, Rothschild Bequest).

Plate 15. Nymphalidae (Figs 1-4, Apaturinae; Fig. 5, Libytheinae; Figs 6-10, Danainae). **1**: *Rohana macar macar* Wallace (female), Sulawesi (Ujung Pandang, 1896, *W. Doherty*, C. Oberthür Coll.). **2**: *Helcyra hemina borneenesis* Hall (holotype male), Borneo (Mt Kinabalu, 5-8.1903, *J. Waterstradt*, C. Oberthür Coll.). **3**: *Hestinalis divona* Hewitson (male), Sulawesi (C. Sulawesi, 17.ix.1975, ex C. G. Treadaway). **4**: *Euripus robustus* Wallace (male), Sulawesi (Manado, J. J. Joicey Coll.). **5**: *Libythea geoffroy celebensis* Staudinger (male), Sulawesi (Dumoga-Bone National Park, Toraut crossing at wet sand, ii.1985, *J. D. Holloway*, Project Wallace Expedition). **6**: *Ideopsis juventa tontoliensis* Fruhstorfer (male), Sulawesi (N. Sulawesi, Tanggari, 1898, P. I. Lathy Coll.). **7**: *Tirumala choaspes kalawara* Martin (male), Sulawesi (Palu, 15.i.1913, *L. Martin*). **8**: *Danaus (Salatura) genutia leucoglene* Felder & Felder (male), Sulawesi (N. Sulawesi, Tanggari, C. Oberthür Coll.). **9**: *Danaus (Anosia) chrysippus chrysippus* Linnaeus (male), Sulawesi (N. Sulawesi, *H. Fruhstorfer*, Fruhstorfer Coll.). **10**: *Parantica sulewattan* Fruhstorfer (female), Sulawesi (G. Lompobatang, 1000-2000 m, 1896, *W. Doherty*, C. Oberthür Coll.).

Plate 16. Nymphalidae (Figs 1-3, Danainae). **1**: *Euploea magou* Martin (male), Sulawesi (Palopo, viii.1978, ex T. Fujioka). **2**: *Idea blanchardii blanchardii* Marchal (male), Sulawesi (Manado, *A. R. Wallace*, Hewitson Coll.). **3**: *Idea tambusisiana hideoi* Okano (male), Sulawesi (Pendoro, 70 km south of Lake Poso, 1200-1500 m, ex Y. Nishiyama).

Key works.— Evans (1949), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Ackery (1989), Maruyama (1991), de Jong & Treadaway (1993c), Bridges (1994), Ackery *et al*. (1999), Braby (2000).

Coeliadinae Evans, 1937

(= Rhopalocamptinae Evans, 1934; unnecessary replacement name:
ICZN 1999 Art. 40; Lamas *et al*., in prep.).
(awls and awlets, policemen — Pl. 1, figs 1-4)

Range.— Palaeotropics; a small group of about 80 species, often crepuscular in habit, included in about seven genera – five of which occur in Sulawesi.

Foodplants.— Asclepiadaceae, Araliaceae, Barringtoniaceae, Bignoniaceae, Combretaceae, Connaraceae, Corynocarpaceae, Euphorbiaceae, Fabaceae, Geraniaceae, Icacinaceae, Malpighiaceae, Malvaceae, Menispermaceae, Moraceae, Myristicaceae, Myrsinaceae, Nyctaginaceae, Oleaceae, Rubiaceae, Sabiaceae, Solanaceae, ?Zingiberaceae.

Key works.— As family.

***Burara* Swinhoe, [1893]**

(awls and awlets — Pl. 1, fig. 1)

Range (1+2+5+6+7): Sri Lanka, India and China to Malay Peninsula, Greater and Lesser Sunda Islands, Philippines and Sulawesi Region. Sixteen species formerly included in *Bibasis* (de Jong & Treadaway, 1993c; Tsukiyama, 1985). Apart from morphological characteristics, they differ from *Bibasis* in being crepuscular (Maruyama, 1991). Chiba (1995, 1997) divided the genus in two species groups, the smaller one continental, the larger one, with 12 species, with a wider distribution, up to 6 of which occur on Sulawesi.

Foodplants.— Araliaceae, Combretaceae, Malpighiaceae, Myristicaceae, Myrsinaceae, ?Zingiberaceae.

Key works.— Evans (1949), Tsukiyama (1985), Maruyama (1991), de Jong & Treadaway (1993a).

B. oedipodea Swainson, 1820 (Branded Orange Awlet)

Range (1+2+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Combretum* (Combretaceae); *Hiptage* (Malpighiaceae).

— **B. oedipodea excellens* Hopffer, 1874

Range.— Sulawesi (N, C, S), Kep. Sula (Mangole).

B. tuckeri Elwes & Edwards, 1897
(Tucker's Awlet)

Note.— Evans (1949) mentioned only two specimens, one from Burma, the other from W Malaysia. Maruyama (1991) recorded the species also from S Thailand, Sumatra and N Borneo. Igarashi & Fukuda (2000) give the distribution as mentioned below.

Range (1+2+6+7).— Sri Lanka, N India to Indo-China, Malay Peninsula, Sumatra,

Java, Borneo, Palawan, Mindanao, Sulawesi, Kep. Banggai and Kep. Sula.

Foodplants.— *Hiptage* (Malpighiaceae) (Robinson *et al*., 2001). Igarashi & Fukuda (2000) describe and illustrate the larva and pupa from the Cameron Highlands, Malay Peninsula. The small tree on which the mature larva was found had already been defoliated and the tree died before it could be identified.

**B. phul* Mabille, 1876
(Mabille's Awlet)

Range (E).— Sulawesi (N, C, S).

Note.— Tsukiyama (1985) includes *phul* in a largely unresolved group of six species, including *gomata*. Old records for the Philippines should be discounted (see de Jong & Treadaway, 1993c).

**B. imperialis* Plötz, 1886
(Imperial Awlet)

Range (R).— Sulawesi Region.

— **B. imperialis imperialis* Plötz, 1886
Range.— Sulawesi (N, C, S).

— **B. imperialis veteratrix* Detani, 1983
Range.— Kep. Banggai (Peleng).

**B. aphrodite* Fruhstorfer, 1905
(Aphrodite's Awlet — Pl. 1, fig. 1)

Range (R).— Sulawesi (C, S), Kep. Banggai (Peleng), Kep. Sula (Mangole).

Note.— The status of this taxon, often treated as a subspecies of *B. harisa* Moore, is discussed by de Jong & Treadaway (1993a).

B. gomata Moore, 1865
(Pale Green Awlet)

Range (1+2+6+7).— India, China, Indo-China, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region.

Note.— Although originally included by Evans (1949) in the *harisa*-group, according to Tsukiyama (1985) the relationships of *gomata* within *Bibasis* (now *Burara*) remain unresolved.

Foodplants.— *Schefflera* (= *Heptapleurum*); *Trevesia* (Araliaceae); *Horsfieldia* (Myristicaceae); *Embelia* (Myrsinaceae). The early stages have been illustrated by Johnston & Johnston (1980) and Igarashi & Fukuda (2000).

— **B. gomata radiosa* Plötz, 1885
Range.— Sulawesi (N, S, C), Bangka, ?Kep. Banggai.

***Bibabis* Moore, 1881**
(awls and awlets)

Range (1+2+5+6+7).— Sri Lanka, India, China and Japan to Malay Peninsula, Greater and Lesser Sunda Islands, Philippines and Sulawesi Region. Unlike *Burara*, the species of this genus are diurnal. The genus comprises three species formerly

recognised by Tsukiyama (1985) as one of the species groups of *Bibasis*. Two of them occur in the Sulawesi Region.

Note.— Bridges (1994) listed six species for *Bibasis*, one of which, *owstoni*, belongs to *Burara*, while two of the others (*mahinta* Moore, 1874, and *nestor* Möschler, 1878) are generally considered subspecies of *iluska*.

Foodplants.— Combretaceae, Malpighiaceae, Nyctaginaceae, Rubiaceae.

Key works.— Evans (1949), Tsukiyama (1985), de Jong & Treadaway (1993a), Maruyama (1991).

B. iluska Hewitson, 1867

Range (5+6).— Assam, Indo-China, Java, Lesser Sunda Islands, Sulawesi Region.

— **B. iluska iluska* Hewitson, 1867

Range.— Sulawesi (N, C, S), Kalao.

Foodplants.— *Hiptage* (Malpighiaceae) (Igarashi & Fukuda, 2000, who also illustrate the early stages).

Note.— Tsukiyama (1985) apparently refers to this taxon under the junior name *mahintha* Moore, 1874, which represents the Assam/Burma race; the reason for abandoning the name *iluska* for the species is not clear, and *mahintha* is not adopted here. Tsukiyama (*op. cit.*) places this butterfly as the sister of the next species, *sena*, in a separate major division of the old, inclusive genus *Bibasis*. Bridges (1994) listed three subspecies of *iluska* (subspecies *mahintha*, *nestor* Möschler, 1878, and *iluska*) as separate species. According to Igarashi & Fukuda (2000) *B. iluska* (the species) is restricted to the Sulawesi Region.

B. sena Moore, 1865

(Orange Tailed Awl)

Range (1+2+5+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region. The species looks superficially like a *Hasora*.

Foodplants.— *Combretum* (Combretaceae); *Hiptage* (Malpighiaceae); *Pisonia* (Nyctaginaceae); *Urophyllum* (Rubiaceae). Igarashi & Fukuda (2000) illustrate the larva and pupa.

— **B. sena senata* Evans, 1934

Range.— Sulawesi (N, C, S), Kep. Banggai.

***Hasora* Moore, 1881**

(awls — Pl. 1, fig. 2)

Range (W).— India and China to New Hebrides and Australia. A genus of over 30 species, divided by Evans (1949) into 6 species groups, four of which (with 10 species recorded) occur in Sulawesi.

Foodplants.— Fabaceae.

Key works.— Evans (1949), de Jong (1982c).

**H. umbrina* Mabille, 1891

Range (E).— Sulawesi (N, S).

H. chromus Cramer, 1782

Range.— From Pakistan to Australia and Fiji. Igarashi & Fukuda (2000) include Sulawesi in their distribution map. Although the species is likely to occur there, we have not seen specimens or pertinent literature references.

Foodplants.— *Ricinus* (Euphorbiaceae); *Derris*, *Pongamia*, *Pithecellobium* (Fabaceae); *Swietenia*, *Trichilia* (Meliaceae); *Murraya*, *Toddalia* (Rutaceae), *Camellia* (Theaceae). Igarashi & Fukuda (2000) illustrate the larva and pupa, and some foodplants.

H. taminatus Hübner, 1818
(White-banded Awl)

Range (W).— Sri Lanka, India to Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, Irian Jaya (Waigeo).

Foodplants.— *Dalbergia*, *Derris, Millettia, Rourea* (Fabaceae); *Terminalia* (Combretaceae). Igarashi & Fukuda (2000) illustrate foodplants and early stages.

— **H. taminatus attenuata* Staudinger, 1889

Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng), Kep. Sula (Sanana).

H. mixta Mabille, 1876
(Pl. 1, fig. 2)

Range (1+2+3+4+6+7).— Indo-China, Thailand (Kimura, 1996), Malay Peninsula, Sumatra, Java, Borneo (Maruyama, 1991), Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Derris* (Fabaceae).

— **H. mixta fenestrata* Fruhstorfer, 1911

Range.— Sulawesi (N, C), Kep. Sangihe (Sangihe, Siao), Wowoni, Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana).

H. badra Moore, 1858
(Common Awl)

Range (1+5+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Balabac, Calamian, Palawan – de Jong & Treadaway, 1993c; not confirmed for other Philippine islands: Treadaway, 1995), Sulawesi (S).

Foodplants.— *Derris, Millettia, Pongamia* (Fabaceae). Igarashi & Fukuda (2000) illustrate foodplants, larva and pupa.

— *H. badra badra* Moore, 1858

Range.— As for species except Sri Lanka.

**H. sakit* Maruyama & Uehara, 1992

Note.— Fujioka *et al*. (1997) synonymized this taxon with *H. quadripunctata*. Maruyama (2000) defends its specific status and illustrates the holotype.

Range (E).— Sulawesi (N, C).

H. quadripunctata Mabille, 1876

Range (2+3+6+7).— Malay Peninsula, Sumatra, Java, Borneo, Philippines (but not

Palawan), Sulawesi, N Maluku (Halmahera, Bacan).

— **H. quadripunctata celebica* Staudinger, 1889

Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng).

Note.— De Jong & Treadaway (1993c) list only N Sulawesi. Maruyama (2000) illustrates the lectotype.

H. vitta Butler, 1870

(Plain Banded Awl)

Range (1+2+7).— India, China, Indo-China, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines, Sulawesi Region, Irian Jaya (Evans, 1949), but not listed for Papua New Guinea by Parsons (1999).

Foodplants.— *Derris*, *Millettia, Phaseolodes, Pongamia, Spatholobus* (Fabaceae). Johnston & Johnston (1980) illustrate the pupa.

— **H. vitta sula* Evans, 1932

Range.— Sulawesi (N, C), Kep. Banggai (Peleng), Kep. Sula (Sanana).

H. moestissima Mabille, 1876

Range (2+4).— Philippines, Sulawesi (N, C, S), Kep. Banggai, central Maluku (Saparua: de Jong, 1982c), ?Aru (de Jong, 1982c).

Note.— Evans (1934) separated the single known specimen from the Aru Islands as ssp. *unica*, but he did not trust the locality. Previous records for Palawan apparently relate to *H. caeruleostriata* de Jong, 1982, which originally was described as a subspecies of *H. moestissima*.

H. khoda Mabille, 1876

(Large Banded Awl)

Range (W).— Assam, Indo-China, Malay Peninsula, Sumatra (de Jong, 1982c), Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, New Caledonia, Lifu, Australia.

Foodplants.— *Millettia* (Fabaceae); in Australia also found on introduced *Wisteria* (Fabaceae) (Braby, 2000).

— **H. khoda burgeri* Ribbe, 1889

Range.— Sulawesi (N, C, S), Kep. Talaud, Kep. Sangihe (Siao), Kep. Banggai (Peleng; Nieuwenhuis, 1946), Tukangbesi (Kaledupa).

H. leucospila Mabille, 189

(Violet Awl)

Range (1+2+4+6+7).— Indo-China, Thailand, Sumatra, Java, Borneo, Palawan (Treadaway, 1995), Philippines, Sulawesi (N, C), Maluku (Ambon).

— *H. leucospila leucospila* Mabille, 1891

Range.— As for species except Maluku.

***Badamia* Moore, 1881**

(awls **—** Pl. 1, fig. 3)

Range (W).— Sri Lanka, Pakistan, India, Indo-China, Malay Peninsula, Sumatra,

Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, Pacific islands, Australia. A genus containing two species, one widespread including Sulawesi and the Pacific, the other restricted to the Pacific.

Foodplants.— Bignoniaceae, Combretaceae, Fabaceae, Malpighiaceae, ?Moraceae, Oleaceae.

Key works.— Evans (1949).

B. exclamationis Fabricius, 1775
(Brown Awl — Pl. 1, fig. 3)

Range (W).— As for genus, including Sulawesi (N, C, S), Kep. Tukangbesi (Tomea), Salayar, Kep. Banggai (Peleng).

Foodplants.— *Bignonia* (Bignoniaceae), *Anogeissus*, *Combretum, Terminalia* (Combretaceae); *Pongamia* (Fabaceae); *Hiptage, Rhyssopteryx, Tristellateia* (Malpighiaceae); ?*Ficus* (Moraceae); *Chionanthus*, *Linociera* (Oleaceae); ?*Bambusa* (Poaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

***Choaspes* Moore, 1881**
(awlkings — Pl. 1, fig. 4)

Range (1+2+3+4+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi, N & C Maluku, New Guinea. Evans (1949) recognised six species but, on the basis of immature stages Igarashi (1992) and Igarashi & Fukuda (1997) convincingly demonstrated that there were more. Depending on the taxonomic rank attached to apparently monophyletic but allopatric island forms, 7-11 species can be distinguished. Whatever scheme is applied, only two have been found on Sulawesi.

Foodplants.— Combretaceae, Icacinaceae, Menispermaceae, Sabiaceae, Sapindaceae.

Key works.— Evans (1949), Chiba (1988), Igarashi (1992), Tsukiyama (1992), Chiba (1992), de Jong & Treadaway (1993a,c), Igarashi & Fukuda (1997).

C. plateni Staudinger, 1888
(Pl. 1, fig. 4)

Range (1+2+6+7).— Assam to Sundaland, Philippines and Sulawesi (Evans, 1949; de Jong & Treadaway, 1993c).

Note.— This is the conventional interpretation, in accordance with Maruyama (1991), Corbet & Pendlebury (1992) and de Jong & Treadaway (1993a, c). The species defined in this way is based on an apparently autapomorphic secondary sexual character. It can be divided into a number of allopatric forms, some of which Chiba (1992) and Tsukiyama (1992) recognise as distinct species (see also de Jong & Treadaway, 1993c: 19). According to these authors *C. plateni* is a species restricted to Sulawesi.

Foodplants.— *Meliosma* (Meliosmaceae); *Pometia* (Sapindaceae) (recorded by Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

— **C. plateni plateni* Staudinger, 1888

Range.— Sulawesi (N, C, S).

C. hemixanthus Rothschild & Jordan, 1903
(Hooked Awlking)

Range (3).— Sulawesi, Halmahera, New Guinea (Igarashi & Fukuda, 1997). Each island has its own subspecies.

Note.— Evans (1949), Chiba (1992) and Tsukiyama (1992) agree in the occurrence of a subspecies of this species, *furcatus* Evans, 1932, in the Asian continent (Nepal to Indo-China and S China, with unconfirmed and improbable occurrence on Palawan), thus making the species highly disjunct. Igarashi & Fukuda (1997) consider *furcatus* a distinct species on the basis of differences in the immature stages. From a biogeographical point of view the opinion of the last authors seems most likely. Without presenting new evidence, Parsons (1999) suggests that the continental *furcatus* as well as the three island subspecies could be four different species. We follow Igarashi & Fukuda (1997).

Foodplants.— *Rhyticaryum* (Icacinaceae); *Meliosma* (Meliosmaceae); *Pycnarrhena* (Menispermaceae); *Sabia* (Sabiaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— **C. hemixanthus wallacei* Tsukiyama & Chiba, 1991

Range.— Sulawesi (C).

Pyrginae Burmeister, 1878
(flats, angles, elfs, grizzled skippers — Pl. 1, figs 5-13)

Range.— Cosmopolitan, about 1200 species in total; in Old World about 300 species in 40 genera; eight of these genera occur in Sulawesi.

Foodplants.— Dicotyledons (with rare exceptions).

Key works.— Evans (1949), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Bridges (1994), Ackery *et al*. (1999)

***Celaenorrhinus* Hübner, 1819**
(flats, sprites — Pl. 1, figs 5, 6)

Range (W).— Pantropical, but not extending to New Guinea or Australia. Of the approximately 90 species, more than 30 occur in the Oriental Region, including four on Sulawesi (mainly in the south).

Foodplants.— Acanthaceae, Fabaceae, Gesneriaceae, Oleaceae, Verbenaceae.

Key works.— Evans (1949), de Jong (1982a).

C. ficulnea Hewitson, 1868
(Velvet Flat — Pl. 1, fig. 5)

Range (1+3+4+7).— Indo-China, Malay Peninsula, Sumatra, Borneo, Palawan (Treadaway, 1995), Sulawesi, Buru, northern Maluku.

Foodplants.— *Didissandra* (Gesneriaceae) (Igarashi & Fukuda, 2000, who also illustrate the foodplant, larva and pupa).

— *C. ficulnea tola* Hewitson, 1878

Range.— Sulawesi (N, S), Maluku (Ternate).

C. ruficornis Mabille, 1878
(Tamil Spotted Flat)

Range (6).— India, Java, Sulawesi Region.

Foodplants.— *Phaulopsis*, *Strobilanthes* (Acanthaceae). Igarashi & Fukuda (2000) illustrate foodplant, larva and pupa.

— **C. ruficornis area* Plötz, 1885 (=*Celaenorrhinus chamunda subconcolor* Röber, 1940; see Evans, 1957b: 749, as "*subcincolor*")

Range.— Sulawesi (S), Kep. Banggai (Peleng).

C. asmara Butler, 1879
(White-banded Flat — Pl. 1, fig. 6)

Range (1+6+7).— Assam, Indo-China, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Sulawesi.

Foodplants.— *Gendarussa* (Acanthaceae) (Igarashi & Fukuda, 2000); *Jasminum* (Oleaceae) (Maruyama, 1991; Igarashi & Fukuda, 2000). The old record of *Clerodendrum* (Verbenaceae) (Piepers & Snellen, 1910) needs confirmation.

— *C. asmara palajava* Staudinger, 1889

Range.— Borneo, Palawan, Sulawesi (S).

C. dhanada Moore, 1865
(Himalayan Yellow-banded Flat)

Range (5+6+7).— India, Indo-China, Sumatra, Borneo, Java, Bali, Lombok, Sulawesi.

Foodplants.— *Phaulopsis* (Acanthaceae) (Igarashi & Fukuda, 2000, who illustrate foodplant, larva and pupa).

— **C. dhanada snelleni* Fruhstorfer, 1909

Range.— Sulawesi (S).

Odina Mabille, 1891
(flats — Pl. 1, fig. 7)

Range (1+2+7).— Sikkim, Assam, Burma, Indo-China, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines (including Luzon and Mindanao: de Jong & Treadaway, 1993c; Tsukiyama & Chiba, 1994; Treadaway, 1995), Sulawesi Region. Evans (1949) recognised two species, one of which was split into three allopatric species by Tsukiyama & Chiba (1994). The latter authors are followed here.

Key works.— Evans (1949), Tsukiyama & Chiba (1994).

**O. chrysomelaena* Mabille, 1891
(Polygon Flat — Pl. 1, fig. 7)

Range (R).— Sulawesi (N, C, S), Kep. Sula (Sanana).

Pseudocoladenia Shirôzu & Saigusa, 1962
(pied flats — Pl. 1, fig. 8)

Range (5+6+7).— India, China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Sulawesi (monobasic).

Note.— Shimonoya & Murayama (1976) described a second species (*pinsbukana*) in the genus, but it belongs to *Coladenia* (de Jong, 1996).

Foodplants.— Amaranthaceae (*Achyranthes, Cyathula*). The record of *Mimosa* (Mimosaceae) (Fleming, 1983) needs confirmation.

Key works.— Shirôzu & Saigusa (1962), Corbet & Pendlebury (1992).

P. dan Fabricius, 1787
(Fulvous Pied Flat — Pl. 1, fig. 8)

Range (5+6+7).— As genus.

Foodplants.— As genus. Igarashi & Fukuda (2000) illustrate foodplants and early stages.

— *P. dan eacus* Latreille, 1823

Range.— Java, Lesser Sunda Islands, Sulawesi (S).

***Coladenia* Moore, 1881**
(pied flats — Pl. 1, fig. 9)

Range (1+2+5+6+7).— Sri Lanka, India and China to Java, Lesser Sunda Islands, Philippines and Sulawesi. About 15 species, only one of which occurs in the Sulawesi Region.

Foodplants.— Euphorbiaceae, Fabaceae, Rosaceae, Rutaceae, Sapindaceae, Tiliaceae.

Key works.— Evans (1949), Corbet & Pendlebury (1992), de Jong & Treadaway (1992b), de Jong (1996).

**C. kehelatha* Hewitson, 1878
(Pl. 1, fig. 9)

Range (R).— Sulawesi (N, C, S), Kep. Sula (Mangole, Sanana).

***Gerosis* Mabille, 1903**
(white, or yellow-breasted flats — Pl. 1, fig. 10)

Range (1+2+6+7).— Eastern Palaearctic (China), India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan (Treadaway, 1995), Philippines, Sulawesi Region. Six species, of which only one, an endemic, occurs in Sulawesi.

Foodplants.— Fabaceae (*Abrus, Dalbergia*).

Key works.— Evans (1949), Corbet & Pendlebury (1992).

**G. celebica* Felder & Felder, 1867
(Pl. 1, fig. 10)

Range (R).— Sulawesi Region.

— **G. celebica celebica* Felder & Felder, 1867

Range.— Sulawesi (N, C, S), Bangka, Kep. Banggai.

— **G. celebica sulina* Evans, 1932

Range.— Kep. Sula (Mangole, Sanana), Buton, Kep. Tukangbesi (Kaledupa, Tomea).

Tagiades Hübner, 1819
(snow or clouded flats — Pl. 1, fig. 11)

Range (W).— Palaeotropics. About 16 species in total, of which the dozen or so occurring in the Indo-Australian region can be divided into two species groups, both represented on Sulawesi by single species.

Foodplants.— Convolvulaceae, Dioscoreaceae, ?Poaceae, Roxburghiaceae, Smilacaceae, ?Tiliaceae.

Key works.— Evans (1949).

T. japetus Stoll, 1781
(Common Snow Flat, or Black and White Flat)

Range (W).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, Australia.

Foodplants.— *Ipomoea* (Convolvulaceae); *Dioscorea* (Dioscoreaceae); *Shorea* (Dipterocarpaceae); *Smilax* (Smilaceae); ?*Zea* (Poaceae); Roxburghiaceae. Igarashi & Fukuda (1997) illustrate larva and pupa.

— **T. japetus prasnaja* Fruhstorfer, 1910
Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng), Salayar.

— **T. japetus obscurata* Staudinger, 1859
Range.— Kep. Sangihe.

— **T. japetus navus* Fruhstorfer, 1910
Range.— Kep. Sula (Mangole, Sanana), Kep. Tukangbesi (Kaledupa).

T. trebellius Hopffer, 1874
(Pl. 1, fig. 11)

Range (1+2+3+4+5+7).— Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku (Maruyama, 1991), New Guinea, Solomon Islands.

Foodplants.— *Dioscorea* (Dioscoreaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— *T. trebellius trebellius* Hopffer, 1874
Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng), Lesser Sunda Islands (Leti).

— **T. trebellius mitra* Mabille, 1895
Range.— Kep. Sula (Mangole, Sanana).

— **T. trebellius sem* Mabille, 1883
Range.— Kep. Talaud, Kep. Sangihe.

Odontoptilum de Nicéville, 1890
(angles — Pl. 1, fig. 12)

Range (1+2+5+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi. A small group of three species, only one of which occurs in Sulawesi; of the other two, one occurs in Sundaland, while the other is restricted to the Philippines.

Foodplants.— Bombacaceae, Malvaceae, Sapindaceae, Tiliaceae.

Key works.— Evans (1949).

O. angulatum Felder, 1862
(chestnut angle — Pl. 1, fig. 12)

Range (2+5+6+7).— As genus, except not recorded from Palawan (Treadaway, 1995).

Foodplants.— *Ceiba*, *Eriodendron* (Bombacaceae); *Hibiscus, Urena* (Malvaceae); *Allophylus* (Sapindaceae); *Grewia, Microcos* (Tiliaceae). Igarashi & Fukuda (1997) illustrate all life stages. Bascombe *et al.* (1999) illustrate the pupa.

— **O. angulatum helias* Felder & Felder, 1867

Range.— Sulawesi (N, C, S).

Caprona Wallengren, 1857
(angles, ragged skippers — Pl. 1, fig. 13)

Range (5+6).— Africa, Sri Lanka, India, China, Indo-China, Java, Lesser Sunda Islands, Sulawesi. Six species; of the three Oriental Region species, the two not found in Sulawesi are restricted to the Asian mainland and Sri Lanka. The genus has not been recorded from the Malay Peninsula, Sumatra, Borneo or the Philippines.

Foodplants.— Sterculiaceae, Tiliaceae, Urticaceae.

Key works.— Evans (1949).

C. agama Moore, 1858
(Spotted Golden Angle — Pl. 1, fig. 13)

Range (5+6).— India, Indo-China, Java, Lesser Sunda Islands, Sulawesi (S).

Foodplants.— *Microcos* (Tiliaceae); *Laportea* (Urticaceae). Igarashi & Fukuda (2000) illustrate a foodplant and the larva and pupa.

— *C. agama agama* Moore, 1858

Range.— As for species, except Lesser Sunda Islands.

Hesperiinae Latreille, 1809
(bobs, redeyes, darters, swifts and skippers — Pl. 2)

Range.— Cosmopolitan, about 2000 species in total; about 300 in the Oriental and Australian Regions, included in over 50 genera, of which about 24 occur in the Sulawesi Region.

Foodplants.— Monocotyledons (with rare exceptions - probably only *Cupitha* Moore, *Udaspes* Moore and *Zographetus* Watson amongst Asian genera: Corbet & Pendlebury, 1992; T. Larsen, pers. comm.).

Key works.— Evans (1949), Common & Waterhouse (1981), Corbet & Pendlebury (1992), Bridges (1994), Ackery *et al*. (1999).

Halpe Moore, 1878
(aces — Pl. 2, fig. 1)

Range (1+2+6+7).— Sri Lanka, India, China, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi. A genus of some 35 Oriental species; the Sulawesi Region, with three endemic species, represents its eastern limit.

Foodplants.— Poaceae.

Key works.— Evans (1949), Bedford Russell (1984), Maruyama (1989), Tsukiyama & Chiba (1991), de Jong & Treadaway (1993d).

**H. beturia* Hewitson, 1868
(Pl. 2, fig. 1)

Range (R).— Sulawesi (N, S), Kep. Banggai (Peleng).

Note.— Formerly treated as conspecific with the Philippine species *H. sulphurifera* Herrich-Schäffer, 1869, *beturia* is now considered to be distinct (de Jong & Treadaway, 1993d).

**H. damar* Bedford Russell, 1984

Range (E).— Sulawesi.

— **H. damar damar* Bedford Russell, 1984

Range.— Sulawesi (C - Mt Tambusisi).

— **H. damar tsukadai* Maruyama, 1989

Range.— Sulawesi (C - 50 km northeast of Palopo).

**H. albicilia* Tsukiyama & Chiba, 1991

Range (E).— Sulawesi (C).

***Psolos* Staudinger, 1889**
(coons — Pl. 2, fig. 2)

Range (1+2+6+7).— India, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi Region (monobasic).

Foodplants.— ?Araceae, Marantaceae.

Key works.— Evans (1949).

P. fuligo Mabille, 1876
(The Coon — Pl. 2, fig. 2)

Range (1+2+6+7).— As genus.

Foodplants.— *Donax, Stachyphrynium* (Marantaceae). According to Igarashi & Fukuda (2000), who illustrate foodplant, larva and pupa, the old record of Araceae needs confirmation.

— * *P. fuligo fuscula* Snellen, 1878

Range.— Sulawesi (N, S), Kep. Banggai (Peleng).

***Ancistroides* Butler, 1874**
(demons — Pl. 2, fig. 3)

Range (1+2+6+7).— India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi, ?N Maluku. A small group of six species.

Foodplants.— Zingiberaceae.

Key works.— Evans (1949).

**A. longicornis* Butler, 1874
(Longhorn Demon — Pl. 2, fig. 3)

Range (E).— "Timor" (?Ternate, ?Sulawesi), Sulawesi (N).

Note.— Butler, in his original description, gives "Timor *Wallace*" as the type information, and "Timor" is repeated by Evans (1949). However, the single type specimen in the BMNH collection is clearly labelled Ternate (*Wallace*); it appears indistinguishable from material from northern Sulawesi, and it seems quite likely that Butler's type did not even come from the Moluccas, but is a mislabelled Wallace specimen from Minahassa (part of Wallace's Malay Archipelago material does appear to be mislabelled).

***Notocrypta* de Nicéville, 1889**
(banded demons — Pl. 2, fig. 4)

Range (W).— Eastern Palaearctic (China), Oriental and Australian Regions, from Sri Lanka to Australia and Fiji. About a dozen species, two of which extend to China, and another to Australia; Sulawesi has representatives of two of the species widely distributed in the Orient.

Foodplants.— Costaceae, Marantaceae, Musaceae, Zingiberaceae.

Key works.— Evans (1949), Corbet & Pendlebury (1992).

N. paralysos Wood-Mason & de Nicéville, 1881
(Banded Demon — Pl. 2, fig. 4)

Range (1+2+4+5+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku.

Foodplants.— *Curcuma*, *Zingiber* (Zingiberaceae).

— *N. paralysos yaya* Fruhstorfer, 1911

Range.— Sulawesi (N, C, S), Kep. Talaud, Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula (Mangole), Maluku (Saparua).

N. feisthamelii Boisduval, 1832
(Spotted Demon)

Range (W).— China, India, Indo-China, Malay Peninsula, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, northern and central Maluku.

Foodplants.— *Costus* (Costaceae); *Maranta* (Marantaceae); *Musa* (Musaceae); *Amomum, Curcuma, Elettaria, Hedychium, Zingiber* (Zingiberaceae).

— **N. feisthamelii celebensis* Staudinger, 1889

Range.— Sulawesi (N, S).

***Cupitha* Moore, 1884**
(wax darts — Pl. 2, fig. 5)

Range (1+6+7).— India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Balabac, Palawan (Treadaway, 1995), Sulawesi Region (monobasic).

Foodplants.— Boraginaceae, Combretaceae.

Key works.— Evans (1949).

C. purreea Moore, 1877
(Wax Dart — Pl. 2, fig. 5)

Range (1+6+7).— As genus, including Sulawesi (N, C, S), Kep. Sula (Mangole)

Foodplants.— *Ehretia* (Boraginaceae) ; *Combretum, Terminalia* (Combretaceae).

Zographetus Watson, 1893
(flitters — Pl. 2, fig. 6)

Range (1+2+5+6+7).— Northern India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi. A heterogeneous group of about eight Oriental species, two of which occur in Sulawesi; apparently very rare.

Foodplants.— Fabaceae, Gnetaceae, Poaceae, Sterculiaceae. The widely differing foodplants may reflect the morphological heterogeneity of the genus.

Key works.— Evans (1949).

Z. rama Mabille, 1877

Range (2).— Indo-China, Malay Peninsula, Sumatra, Philippines (Mindoro, Leyte, Samar: Treadaway, 1995), Sulawesi (N).

Foodplants.— *Gnetum* (Gnetaceae) (Igarashi & Fukuda, 2000, who also illustrate foodplant, larva and pupa).

Z. abima Hewitson, 1877
(Pl. 2, fig. 6)

Range (1).— Palawan (Treadaway, 1995), Sulawesi (N, C, S).

Foodplants.— *Pterospermum* (Sterculiaceae) (Igarashi & Fukuda, 2000, who also illustrate foodplant, larva and pupa).

Plastingia Butler, 1870
(lancers — Plate 2, fig. 7)

Range (1+2+6+7).— Northern India, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi Region. Eliot (*in* Corbet & Pendlebury, 1978), in proposing the new genera *Xanthoneura, Salanoemia, Pyroneura* and *Pemara*, reduced *Plastingia* to a group of six Oriental species, three of which are endemic to the Sulawesi Region.

Foodplants.— Arecaceae.

Key works.— Evans (1949), Corbet & Pendlebury (1992).

**P. mangola* Evans, 1949

Range (R).— Sulawesi (S), Kep. Sula (Mangole, Sanana).

**P. tessellata* Hewitson, 1866
(Straw Spotted Lancer — Pl. 2, fig. 7)

Range (R).— Sulawesi Region.

Foodplants.— Possibly *Arenga* (Arecaceae), like the related *P. naga* de Nicéville

(Assam through Sundaland to Philippines). Igarashi & Fukuda (2000) illustrate larva and pupa.

— **P. tessellata tessellata* Hewitson, 1866

Range.— Sulawesi (N, C, S), Bangka, Kep. Banggai, Kep. Sula (Mangole, Sanana).

— **P. tessellata tessa* Evans, 1949

Range.— Kep. Sangihe.

**P. flavescens* Felder, 1867

Range (E).— Sulawesi (N, C, S).

Lotongus Distant, 1886

(palmers — Pl. 2, fig. 8)

Range (1+2+6+7).— Northern India, China, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region. A small group of three species, one of which extends to Sulawesi.

Foodplants.— Arecaceae.

Key works.— Evans (1949), Eliot (*in* Corbet & Pendlebury, 1978).

L. calathus Hewitson, 1876

(White-tipped Palmer — Pl. 2, fig. 8)

Range (1+2+6+7).— Burma, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (Basilan: Treadaway, 1995; Mindanao: Treadaway, in litt.), Sulawesi Region.

Foodplants.— *Calamus, Cocos, Daemonorops, Trachycarpus* (Arecaceae); remarkably, the larvae have been found in Malaysia in apparently mutual association with *Dolichoderus* ants (Igarashi & Fukuda, 1997, who also illustrate all life stages).

— **L. calathus taprobanus* Plötz, 1885

Range.— Sulawesi (N, C, S), Kep. Banggai.

Gangara Moore, 1881

(redeyes — Pl. 2, fig. 9)

Range (1+2+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi. A small group of four large skippers, one of which is distributed throughout the generic range, doubtfully including Sulawesi, and another is a Sulawesi endemic.

Foodplants.— Arecaceae, Musaceae.

Key works.— Evans (1949), de Jong (1992).

G. thyrsis Fabricius, 1775

(Giant Redeye — Pl. 2, fig. 9)

Range.— As genus, except only uncertainly recorded from Sulawesi. The record is based on two males in BMNH from "Celebes", reported by Evans (1949) - but this requires confirmation before being accepted as genuine.

Foodplants.— *Arenga, Calamus, Caryota, Cocos, Eugeissona, Korthalsia, Licuala, Livis-*

tona, Metroxylon, Nypa, Phoenix, Roystonea, Trachycarpus (Arecaceae); *Musa* (Musaceae); *Philydrum* (Philydraceae). Igarashi & Fukuda (2000) illustrate the larva and pupa; the larva is decorated with waxy filaments

**G. tumpa* de Jong, 1992

Range (E).— Sulawesi (N).

Erionota Mabille, 1878

(redeyes, banana skippers — Pl. 2, fig. 10)

Range (1+2+3+5+6+7).— Northern India, southern China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N Maluku; *E. thrax thrax*, a banana pest, has extended to Mauritius (since 1970), Guam (since 1956), Saipan (1960s), Hawaii (since 1973), and Papua New Guinea (since 1986: see Waterhouse & Norris, 1989). A group of seven large skippers of mainly Oriental distribution, three of which (including one endemic) are found on Sulawesi.

Foodplants.— Arecaceae, Musaceae, Zingiberaceae.

Key works.— Evans (1949), de Jong & Treadaway (1992a).

E. thrax Linnaeus, 1767

(Banana Skipper, or Palm Redeye)

Range (1+2+3+5+6+7).— As genus, including Sulawesi (N, C, S), Kep. Sangihe, Kep. Banggai (Peleng) and Kep. Sula; not recorded from central Maluku.

Foodplants.— *Arenga, Calamus, Cocos, Elaeis, Licuala, Metroxylon, Nypa, Rhapis* (Arecaceae); *Australimusa, Eumusa, Musa* (Musaceae); *Chrysopogon*, *Saccharum* (Poaceae); *Ravenala* (Strelitziaceae); *Curcuma* (Zingiberaceae). Igarashi & Fukuda (2000) illustrate the early stages.

— *E. thrax thrax* Linnaeus, 1767

Range.— As species except some parts of Philippines (see Treadaway, 1995), Kep. Sula and Maluku.

— *E. thrax hasdrubal* Fruhstorfer, 1910

Range.— Kep. Sula (Mangole, Sanana), N Maluku, New Guinea (Parsons, 1999).

E. hiraca Moore, 1881

(Pl. 2, fig. 10)

Range (1+2+6+7).— Sikkim, Assam, Indo-China, Malay Peninsula, Nias, Java, Borneo, Palawan (Treadaway, 1995), Philippines (Luzon, Mindoro, Polillo, Ticao, Leyte, Samar, Mindanao: Treadaway, 1995), Sulawesi Region.

Note.— Until recently this species has been known as *E. acroleuca* Wood-Mason & de Nicéville, 1881 (see de Jong & Treadaway, 1992a).

Foodplants.— *Elaeis* (Arecaceae).

— **E. hiraca sakita* Ribbe, 1895

Range.— Sulawesi (N, C, S), Bangka, Kep. Banggai (Peleng), Kep. Sula (Mangole).

**E. tribus* Evans, 1941

Range (E).— Sulawesi (N, C, S).

***Ilma Swinhoe, 1905**

(Pl. 2, fig. 11)

Range (E).— Sulawesi (N, C, S) (monobasic).

Key works.— Evans (1949).

**I. irvina* Plötz, 1886

(Pl. 2, fig. 11)

Range (E).— As genus.

***Matapa* Moore, 1881**

(branded redeyes **—** Pl. 2, fig. 12)

Range (1+2+5+6+7).— India, southern China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda islands, Borneo, Palawan, Philippines, Sulawesi Region. A genus of eight or nine Oriental species, two of which occur on Sulawesi.

Foodplants.— Poaceae.

Key works.— Evans (1949), de Jong (1983, 1987).

**M. celsina* Felder & Felder, 1867

(Pl. 2, fig. 12)

Range (R).— Sulawesi (N, C, S), Kep. Banggai.

M. intermedia de Jong, 1983

Range (2).— Philippines (Samar: Treadaway, 1995), Sulawesi.

— **M. intermedia intermedia* de Jong, 1983

Range.— Sulawesi (N).

***Acerbas* de Nicéville, 1895**

(wights **—** Pl. 2, fig. 13)

Range (2+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Philippines, Sulawesi, and Kep. Banggai (Detani, 1983). A small group of seven or eight Oriental skippers, three of which are Sulawesi endemics (but see also Chiba, 1989).

Foodplants.— Arecaceae (Igarashi & Fukuda, 2000).

Key works.— Evans (1949), de Jong (1982b), Bedford Russell (1984).

**A. azona* Hewitson, 1866

(Pl. 2, fig. 13)

Range (R).— Sulawesi (S), ?Kep. Banggai (Peleng; Detani, 1983).

**A. latefascia* de Jong, 1982

Range (E).— Sulawesi (N).

Note.— This and the next species belong to the *A. duris* complex, known from Pulo Laut (S. Borneo), Philippines and Sulawesi. Chiba (1989) suggested that *A. latefascia* and *A. suttoni* may prove to be synonymous. This could be correct, but more material is needed to take a final decision.

**A. suttoni* Bedford Russell, 1984

Range (E).— Sulawesi (C).

Note.— Chiba (1989) describes and illustrates the female.

Pirdana Distant, 1886

(green palmers — Pl. 2, fig. 14)

Range (1+2+6+7).— Sikkim, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (Luzon, Samar, Mindanao; Treadaway, 1995) and Sulawesi. A small Oriental group of four or five species, one of which is endemic to Sulawesi.

Foodplants.— Liliaceae (*Cordyline, Dracaena, Peliosanthes*).

Key works.— Evans (1949), de Jong & Treadaway (1993b), Chiba & Tsukiyama (1993, 1994).

**P. ismene* Felder & Felder, 1867

(Pl. 2, fig. 14).

Range (E).— Sulawesi (N).

Note.— This taxon was raised to species rank by de Jong & Treadaway (1993b), from *P. hyela*.

Taractrocera Butler, 1870

(grass darts — Pl. 2, fig. 15)

Range (1+2+5+6+7).— Eastern Palaearctic, Oriental and Australian Regions. Sixteen species occurring from Sri Lanka and China to the Philippines, Lesser Sunda Islands, New Guinea, Australia and Tasmania. There do not seem to be any reliable records for the Moluccas. The seven Australian and New Guinea species on one hand, and the Oriental species on the other, although almost completely separated geographically, are both paraphyletic groups. The three Sulawesi species all belong to the 'Oriental series' (de Jong, 1991, 2001; in press).

Foodplants.— Poaceae.

Key works.— Evans (1949), de Jong (1991; in press).

T. ardonia Hewitson, 1868

Range (7).— Malay Peninsula, Sumatra, Borneo, Sulawesi Region.

— **T. ardonia ardonia* Hewitson, 1868

Range.— Sulawesi (S), Kep. Sangihe, Salayar.

T. luzonensis Staudinger, 1889 (= *ziclea* Plötz, 1884, *sensu auctt.*)

(Veined Grass Dart)

Range (1+2+7).— Burma, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines

(Treadaway, 1995), Sulawesi Region.

Note.— Until the publication of de Jong (1991), this taxon was usually referred to by the name *T. ziclea* Plötz, 1884.

— **T. luzonensis dongala* Evans, 1932

Range.— Sulawesi (N, C), Kep. Banggai (Peleng), Kep. Sula.

— **T. luzonensis bessa* Evans, 1949

Range.— Salayar, Kep. Tukangbesi (Kaledupa), Tanahjampea.

T. nigrolimbata Snellen, 1876 (= *aliena* Plötz, 1883)
(Yellow Grass Dart — Pl. 2, fig. 15)

Range (5+6).— Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Sulawesi.

Note.— This species was formerly known as *T. aliena* Plötz, 1883 (see de Jong, 1991).

— *T. nigrolimbata talantus* Plötz, 1885

Range.— Lesser Sunda Islands, Sulawesi (S).

Oriens Evans, 1932
(dartlets — Pl. 2, fig. 16)

Range (1+2+5+6+7).— Sri Lanka, India, southern China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, Fiji and Samoa. Seven of the eight species have essentially Oriental distributions (including the single Sulawesi endemic), but the eighth is a disjunct Pacific species (Fiji and Samoa, Australia).

Foodplants.— Poaceae.

Key works.— Evans (1949).

**O. alfurus* Plötz, 1885
(Pl. 2, fig. 16)

Range (E).— Sulawesi (N, S).

Potanthus Scudder, 1872
(darts — Pl. 2, fig. 17)

Range (W).— Eastern Palaearctic and Oriental Regions to Maluku and Waigeo (Maruyama, 1991), but unconfirmed for mainland New Guinea (Parsons, 1999). About 30 species, four of which occur in Sulawesi.

Note.— This genus is much in need of revision.

Foodplants.— Poaceae. Records of other families need confirmation.

Key works.— Evans (1949).

P. omaha Edwards, 1863
(The Lesser Dart)

Range (2+5+7).— Indo-China, Malay Peninsula, Sumatra, Lesser Sunda Islands, Borneo, Philippines (Mindanao, Tawitawi: Treadaway, 1995), Sulawesi.

— **P. omaha nita* Evans, 1934

Range.— Sulawesi (S).

P. fettingi Möschler, 1878
(Pl. 2, fig. 17)

Range (3+4+5+6+7).— Sumatra, Java, Bali, Lombok, Borneo, Philippines (Luzon: de Jong & Treadaway, 1993c), Sulawesi Region, northern and central Maluku, Waigeo.

Note.— This species was formerly known as *P. taxilus* Mabille, [1879] - see Maruyama (1991).

— **P. fettingi nikaja* Fruhstorfer, 1911

Range.— Sulawesi (N, S), Kep. Talaud, Kep. Sangihe (Siao), Kep. Banggai, Kep. Sula (Sanana), Kep. Tukangbesi (Kaledupa, Tomea), Tanahjampea, Kalao.

P. pava Fruhstorfer, 1911

Range (2).— India, China, Indo-China, Malay Peninsula, Philippines, Sulawesi.

— *P. pava lesbia* Evans, 1934

Range.— Philippines (Luzon, Mindoro, Polillo, Dinagat, Sibuyan, Mindanao, but excluding Palawan: Treadaway, 1995), Sulawesi (C).

P. hetaerus Mabille, 1883

Range (2).— Philippines (Treadaway, 1995), Sulawesi (see de Jong & Treadaway, 1993c).

— **P. hetaerus dina* Evans, 1934

Range.— Sulawesi (S).

Telicota **Moore, 1881**

(darters — Pl. 2, fig. 18)

Range (W).— Eastern Palaearctic, Oriental and Australian Regions. At least 35 species, with highest diversity in New Guinea; three species occur in Sulawesi.

Foodplants.— Arecaceae, Flagellariaceae, Poaceae.

Key works.— Evans (1949), Parsons (1986, 1999).

T. colon Fabricius, 1775
(Pale Darter)

Range (1+2+3+4+5+6).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, Pacific islands, Australia. Maruyama (1991) notes the lack of any record for Borneo.

Foodplants.— *Chrysopogon*, *Imperata, Microstegium, Miscanthus*, *Ophiurus*, *Oryza*, *Phragmites*, *Pennisetum*, *Saccharum, Setaria, Zizania* (Poaceae). Igarashi & Fukuda (2000) illustrate larva and pupa.

— *T. colon vaja* Corbet, 1942

Range.— Sumatra, Java, Lesser Sunda Islands, Palawan, Philippines, Sulawesi (N, C, S), Kep. Sangihe, Kep. Banggai.

— *T. colon argeus* Plötz, 1883

Range.— Tanahjampea, eastern Lesser Sunda Islands, Australia.

T. ohara Plötz, 1883
(Dark Darter)

Range (W).— Assam, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, N & C Maluku, New Guinea.

Foodplants.— *Oryza*, *Setaria* (Poaceae).

— **T. ohara rahula* Fruhstorfer, 1911

Range.— Sulawesi (S).

T. ternatensis Swinhoe, 1907
(Pl. 2, fig. 18)

Range (3+4).— Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands.

— **T. ternatensis testa* Evans, 1934

Range.— Sulawesi (N, C, S), Kep. Banggai.

— **T. ternatensis ranga* Evans, 1949

Range.— Kep. Talaud, Kep. Sangihe (Sangihe, Siao). Evans (1949) recorded 2 males and one female from "Salayer"; probably, the specimens are mislabelled, or else they represent a parallel development.

— **T. ternatensis sula* Evans, 1949

Range.— Kep. Sula (Mangole, Sanana).

Cephrenes Waterhouse & Lyell, 1914

(palm darts — Pl. 2, fig. 19)

Range (W).— Oriental and Australian Regions, from north-eastern India to Solomon Islands and Australia. Of the eight species, all but one have eastern distributions. One of the two *Cephrenes* found on Sulawesi represents the western species.

Foodplants.— Arecaceae.

Key works.— Evans (1949), Parsons (1999), Braby (2000).

C. acalle Hopffer, 1874
(Plain Palm Dart)

Range (1+2+6+7).— India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi.

Note.— Until recently this species was known as *C. chrysozona* Plötz, 1883, but Maruyama (1991), checking Hopffer's type of *Hesperia acalle*, found it to belong to the same taxon as *Cephrenes chrysozona lompa* Evans, 1934. The genitalia of the type of the latter were checked by de Jong (pers. obs., 2001).

Foodplants.— *Calamus, Cocos, Elaeis, Ptychosperma, Roystonea* (Arecaceae). Igarashi & Fukuda (2000) illustrate larva and pupa.

— **C. acalle acalle* Hopffer, 1874 (=*lompa* Evans, 1934)

Range.— Sulawesi (N, C, S).

C. augiades Felder & Felder, 1860
(Orange Palmdart — Pl. 2, fig. 19)

Range.— Lesser Sunda Islands, ?Sulawesi, N & C Maluku, New Guinea region, Solomon Islands, Australia.

Foodplants.— Many Arecaceae: *Archontophoenix*, *Calamus*, *Carpentaria*, *Cocos*, *Elais* (introduced African oil palm), *Hydriastele*, *Laccospadix*, *Licuala*, *Livistona*, *Ptychosperma*, *Rhopalostylus*, *Wodyetia* (many of these only known from observations in Australia, see Braby, 2000).

— *C. augiades augiades* Felder & Felder, 1860

Range: ?Sulawesi, Ambon, Seram, Gisser. The occurrence on Sulawesi is highly uncertain. Evans (1949) mentioned three males under ssp. *augiades*, but only two specimens can be found in the collection in London (Ackery, pers. comm., 2001). One would expect the Sulawesi specimens to be most similar to ssp. *buruana* from Buru and not to ssp. *augiades* from further east. One specimen is from 'Mt. Mata, Celebes'. Evans (1949) suspects this to be Mt. Mada on Buru. The other specimen, only bearing 'Celebs' as locality could as well be mislabelled.

***Prusiana* Evans, 1937**

(Pl. 2, fig. 20)

Range (1+2+3+4+7).— Borneo, Palawan, Philippines, Sulawesi Region, Maluku, Kep. Kai. A small group of three Wallacean species, all found on Sulawesi, with one extending west to Palawan and east to Kep. Kai, one shared only with Borneo, and one endemic.

Key works.— Evans (1949), Maruyama (1991).

P. kuehni Plötz, 1886

(Pl. 2, fig. 20)

Range (7).— Borneo (Kinabalu, Kalimantan, Pulo Laut - see Maruyama, 1991), Sulawesi Region.

— **P. kuehni kuehni* Plötz, 1886

Range.— Sulawesi (N, C, S), Kep. Banggai

**P. hercules* Mabille, 1889

Range (E).— Sulawesi (S).

P. prusias Felder & Felder, 1861

Range (1+2+3+4).— Palawan, Philippines, Sulawesi Region, N & C Maluku.

Note.— Old records of *prusias* from Borneo should be discounted; they refer to *P. kuehni insularis* (see Maruyama, 1991).

— *P. prusias matinus* Fruhstorfer, 1911

Range.— Palawan, Philippines, Kep. Sangihe, ?Sulawesi (see de Jong & Treadaway, 1993c).

— *P. prusias prusias* Felder & Felder, 1861

Range.— Sulawesi (S), Kep. Banggai, Kep. Sula (Mangole, Sanana), Salayar, N & C Maluku, Teoor.

***Parnara* Moore, 1881**

(swifts, watchmen — Pl. 2, fig. 21)

Range (1+2+3+5+6+7).— Palaeotropics. A small group of nine species collectively

having a very wide range, from Africa to Australia; two occur on Sulawesi.

Foodplants.— Arecaceae, Poaceae.

Key works.— Evans (1949), Chiba & Eliot (1991).

P. kawazoei Chiba & Eliot, 1991
(Pl. 2, fig. 21)

Range (2+7).— Borneo, Philippines (Luzon, Visayan islands, Mindanao), Sulawesi.

Note.— Evans (1949) recorded this species from Sulawesi under the name *P. guttata andra* Evans, which proved to be a misidentification (Chiba & Eliot, 1991).

P. bada Moore, 1878
(Ceylon Swift, Water Watchman)

Range (1+2+3+5+6+7).— Sri Lanka to southern Japan, east to Lesser Sunda Islands, Philippines, N Maluku, New Guinea (Parsons, 1999) and Australia.

Foodplants.— *Colocasia* (Arecaceae); *Apluda, Bambusa, Leersia, Miscanthus, Oryza, Saccharum, Zea* (Poaceae).

— *P. bada bada* Moore, 1878

Range.— Sri Lanka, India, China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi (N, S), N Maluku (Bacan).

Note.— According to Treadaway (1995) the Philippine populations are attributable to *P. bada borneana* Chiba & Eliot, 1991, but according to the authors of this name ssp. *borneana* is restricted to Borneo.

Borbo **Evans, 1949**
(swifts **—** Pl. 2, fig. 22)

Range (W).— Palaeotropics, with about 18 species in the Afrotropical Region (one extending into Mediterranean region) and 5 in the Indo-Australian, two of which occur in Sulawesi.

Foodplants.— Poaceae.

Key works.— Evans (1949).

B. cinnara Wallace, 1866
(Rice Swift)

Range (W).— Sri Lanka (Harish Gaonkar, pers. comm.), India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi (N, S), Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula, Maluku (no details), New Guinea region, Solomon Islands, Vanuatu, New Caledonia, Australia.

Foodplants.— *Andropogon*, *Apluda, Axonopus, Brachiaria, Cymbopogon, Digitaria, Eulalia, Eleusine, Eragrostis, Imperata, Isachne, Ischaemum, Miscanthus, Oryza, Oplismenus, Panicum, Paspalum, Pennisetum, Rottboellia, Saccharum, Setaria, Spodipogon, Urochloa, Zizania* (Poaceae).

B. bevani Moore, 1878
(Bevan's Swift — Pl. 2, fig. 22)

Range (4+6).— India, Burma, China, Indo-China, peninsular Thailand, Sumatra,

Java, Sulawesi (S), central Maluku, Australia. Not known from Malay Peninsula (Corbet & Pendlebury, 1992).

Foodplants.— *Imperata, Oryza, Paspalum, Saccharum* (Poaceae).

Note.— Lee (1966) erected the monotypic genus *Pseudoborbo* for this species on the basis of differences in the male and female genitalia with other *Borbo* species. We do not accept this separation; a comparative study involving related genera is required to justify such an action.

Pelopidas **Walker, 1870**

(swifts, millet skippers — Pl. 2, fig. 23)

Range (W).— Palaeotropics, eastern Mediterranean and eastern Palaearctic. The genus is distributed from Africa and Turkey to the south-west Pacific; two of the ten species occur on Sulawesi.

Foodplants.— Poaceae.

Key works.— Evans (1949).

P. agna Moore, 1866

(Common, or Bengal Swift — Pl. 2, fig. 23)

Range (W).— Sri Lanka and Kashmir to N & C Maluku, Solomon Islands, Australia and Vanuatu.

Foodplants.— *Imperata, Ischaemum, Microstegium, Oryza, Paspalum, Saccharum, Sorghum* (Poaceae).

— *P. agna agna* Moore, 1866

Range.— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi (N, S), Kep. Talaud, Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula, Kep. Tukangbesi (Kaledupa).

P. mathias Fabricius, 1798

(Small Branded or Black Branded Swift, Lesser Millet Skipper)

Range (1+2+5+6+7).— As genus, but not recorded from northern or central Maluku, and apparently absent from Australia.

Foodplants.— *Andropogon, Cymbopogon, Digitaria, Dinochloa, Imperata, Miscanthus, Oryza, Paspalum, Saccharum, Sorghum, Zea* (Poaceae). Also recorded from *Caryota*, *Livistona* (Arecaceae) and *Crotolaria* (Fabaceae), but these records need conformation.

— *P. mathias mathias* Fabricius, 1798

Range.— Africa, Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi (N, C), Kep. Banggai (Peleng), Tanahjampea, Kalao.

Polytremis **Mabille, 1904**

(swifts — Pl. 2, fig. 24)

Range (5+6+7).— India, China, Japan, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Sulawesi Region. About a dozen species, mostly Indo-Chinese in distribution, but with one ranging from India through the Malay Peninsula to the Lesser Sunda Islands and Sulawesi Region.

Foodplants.— Poaceae.
Key works.— Evans (1949).

P. lubricans Herrich-Schäffer, 1869
(Contiguous Swift — Pl. 2, fig. 24)

Range (5+6+7).— From India to Sulawesi, as indicated under the genus.
Foodplants.— *Imperata, Microstegium, Miscanthus* (Poaceae). Igarashi & Fukuda (2000) illustrate larva and pupa.
— *P. lubricans lubricans* Herrich-Schäffer, 1869
Range.— India, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Philippines (Sulu archipelago: see de Jong & Treadaway, 1993c, Treadaway, 1995), Sulawesi (N, C, S), Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula.

Caltoris Swinhoe, 1893
(swifts — Pl. 2, fig. 25)

Range (W).— Eastern Palaearctic, Oriental and Australian Regions, from India and China to Solomon Islands. A genus of about 18 species, four of which occur in the Sulawesi Region.
Foodplants.— Poaceae (*Bambusa, Imperata*).
Key works.— Evans (1949).

C. bromus Leech, 1894
Range (1+2+5+6+7).— India, China, Taiwan, Okinawa, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines (Visayan islands, Mindanao: Treadaway, 1995), Sulawesi (S).
Foodplants.— *Bambusa* (Poaceae).
— *C. bromus bromus* Leech, 1894
Range.— As species, excluding Taiwan and Okinawa.

C. philippina Herrich-Schäffer, 1869
(Philippine Swift)

Range (1+2+3+4).— Sri Lanka, India, Malay Peninsula, Nias, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands.
— *C. philippina philippina* Herrich-Schäffer, 1869
Range.— Sri Lanka, India, Malay Peninsula, Nias, Palawan, Philippines, Sulawesi (N, S), Kep. Talaud, Kep. Sangihe, Kep. Sula (Mangole, Sanana).

C. mehavagga Fruhstorfer, 1911
(Pl. 2, fig. 25)

Range (4).— Sulawesi (C, S), Kep. Sula (Mangole), Maluku (Buru).

**C. beraka* Plötz, 1885
Range (R).— Sulawesi (C, S), Kep. Sangihe, Kep. Sula (Sanana).

Papilionidae Latreille, [1802]
(swallowtails and parnassians)

Range.— Cosmopolitan; about 550 species in three subfamilies, only one of which occurs in the Malay Archipelago, including the Sulawesi Region.

Foodplants.— Approximately 45 families of flowering plants, amongst which the following are particularly important: Annonaceae, Aristolochiaceae, Lauraceae, Magnoliaceae and Rutaceae.

Status.— The Papilionidae are the only family of insects to have been made the subject of an IUCN Red Data Book; the conservation status is given for each species, following Collins & Morris (1985) and Baillie & Groombridge (1996). See also New & Collins (1991).

Key works.— Munroe (1961), Igarashi (1979, 1984), Haugum *et al.* (1980), d'Abrera (1982), Tsukada & Nishiyama (1982), Hancock (1983b), Collins & Morris (1985), Bridges (1988a), Corbet & Pendlebury (1992), Häuser (1993), Tyler *et al.* (1994), Scriber *et al.* (1994), Parsons (1996a,b), Igarashi & Fukuda (1997, 2000), Häuser *et al.* (2001).

Papilioninae Latreille, [1802]
(birdwings, kites and swallowtails — Pls 3-5)

Range.— Cosmopolitan; about 480 species in four tribes, three of which occur in the Sulawesi Region.

Foodplants.— As family.

Key works.— Tsukada & Nishiyama (1982), Hancock (1983b), Collins & Morris (1985), Miller (1987), Bridges (1988a).

Troidini Talbot, 1939
(birdwings, batwings, roses, windmills and clubtails — Pl. 3)

Range.— Pantropical (except for African mainland), with weak extension into temperate regions; about 130 species in 12 genera, 4 of which occur in the Sulawesi Region: *Troides*, *Atrophaneura*, *Losaria* and *Pachliopta*. *Ornithoptera* is very doubtfully recorded from Kep. Sula.

Foodplants.— Aristolochiaceae.

Key works.— Munroe (1961), Tsukada & Nishiyama (1982), Collins & Morris (1985), Miller (1987), Parsons (1996a,b), de Jong (2003), Vane-Wright (in press a).

***Troides* Hübner, 1819**
(birdwings — Pl. 3, figs 1, 5)

Range (W).— Oriental Region, including Philippines, Lesser Sunda Islands, Sulawesi and Maluku, with one species extending into the Papuan Region. About 20 species, in 2 subgenera (one monobasic). All species are protected under CITES.

Foodplants.— *Aristolochia, Thottea* (Aristolochiaceae).

Key works.— d'Abrera (1975), Igarashi (1979), Tsukada & Nishiyama (1982), Haugum & Low (1985), Collins & Morris (1985), Miller (1987), Parsons (1996a,b), Igarashi & Fukuda (1997), Matsuka (2001).

Troides (*Ripponia)* Haugum & Low, 1975
(birdwings — Pl. 3, fig. 1)

Range.— A single species restricted to the Sulawesi Region and Maluku. Sometimes placed as a separate genus, but its distinction from *Troides* is doubtful (Matsuka, 2001: 163).

Foodplants.— *Aristolochia* (Aristolochiaceae).

Key works.— d'Abrera (1975), Tsukada & Nishiyama (1982), Haugum & Low (1985), Collins & Morris (1985), Miller (1987), Parsons (1996a,b), Igarashi & Fukuda (1997), Matsuka (2001).

T. (R.) hypolitus Cramer, 1775
(Rippon's Birdwing — Pl. 3, fig.1)

Range (3+4).— Sulawesi Region, N & C Maluku.

Foodplants.— *Aristolochia* (Aristolochiaceae). Igarashi & Fukuda (1997) illustrate all life stages (see also Igarashi, 1979; Matsuka, 2001).

Status.— Not rare and apparently not threatened, but protected in Indonesia.

— **T. (R.) hypolitus cellularis* Rothschild, 1895

Range.— Sulawesi, Kep. Sangihe, ?Kep. Talaud, Kep. Togian, Buton, Muna, Kep. Tukangbesi (Wangiwangi, Tomea, Binongko), Salayar (Matsuka, 2001).

— **T. (R.) hypolitus caelicola* Haugum & Low, 1982

Range.— Kep. Banggai (Peleng, Potil-besar).

— **T. (R.) hypolitus sulaensis* Staudinger, 1895

Range.— Kep. Sula (Mangole, Sanana, Taliabu).

Troides (*Troides)* Hübner, 1819
(birdwings — Pl. 3, fig. 5)

Range.— As genus.

Foodplants.— As genus.

Key works.— As genus.

T. (T.) helena Linnaeus, 1758
(Common Yellow Birdwing — Pl. 3, fig. 5)

Range (5+6+7).— India, Indo-China, Hainan, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Sulawesi Region. This and the next four species belong to the *helena*-group, comprising about 15 species with a total distribution extending from Sri Lanka to New Guinea (including the Philippines and the Lesser Sunda Islands).

Foodplants.— *Aristolochia, Thottea* (Aristolochiaceae). Igarashi & Fukuda (1997) illustrate the early stages (see also Igarashi, 1979; Matsuka, 2001).

Status.— Often common, but vulnerable in places (Peninsular Malaysia); protected in Indonesia.

— **T. (T.) helena hephaestus* Felder & Felder, 1864

Range.— Sulawesi, Salayar, Kep. Tukangbesi (Tomea, Binongko), Kabaena, Muna, Kabaena, Buton, Kep. Banggai (Peleng), ?Kep. Sula (Matsuka, 2001).

T. (T.) oblongomaculatus Goeze, 1779
(Eastern Yellow Birdwing)

Range (4).— Sulawesi, central Maluku, New Guinea.

Foodplants.— *Aristolochia* (Aristolochiaceae). Igarashi & Fukuda (1997) illustrate the early stages (see also Matsuka, 2001).

Status.— Common, not threatened.

— **T. (T.) oblongomaculatus thestius* Staudinger, 1895

Range.— Salayar, Buton, Kep. Tukangbesi, Tanahjampea (Matsuka, 2001).

— **T. (T.) oblongomaculatus* subsp. ('Celebean form': Haugum & Low, 1985)

Range.— Sulawesi (N, C, S).

Note.— Hancock (1983b) considered the rare Sulawesi *oblongomaculatus* might be examples of *T. helena* affected by introgression from *T. haliphron*; Haugum & Low (1985) considered them to represent a relict race of uncertain status. Not included by Matsuka (2001). Andrew Rawlins (pers. comm.) is also of the opinion that this species does not occur on mainland Sulawesi.

— *T. (T.) oblongomaculatus bouruensis* Wallace, 1865 (= *mangolensis* Tsukada & Nishiyama, 1982)

Range.— Kep. Sula (Mangole), Buru, Ambelau. Andrew Rawlins (pers. comm.) is of the opinion, based on information from H. Detani, that *mangolensis* was based on mislabelled material from Buru, and that *T. oblongomaculatus* does not occur on Kep. Sula.

T. (T.) haliphron Boisduval, 1836
(Southern Yellow Birdwing)

Range (5).— Southern Sulawesi Region, S Maluku (Lucipara island), Lesser Sunda Islands.

Foodplants.— "Small-leaved *Aristolochia*" (Aristolochiaceae) (Matsuka, 2001, who also illustrates all stages; see also Igarashi, 1979).

Status.— Not known to be threatened, but protected in Indonesia.

— **T. (T.) haliphron haliphron* Boisduval, 1836

Range.— Sulawesi (C, S, SE).

— **T. (T.) haliphron pallens* Oberthür, 1879

Range.— Salayar.

— **T. (T.) haliphron pistor* Rothschild, 1896

Range.— Tanahjampea, Kayuadi, Kalao, Kalaotoa, Karompa, Madu, Bonerate (Matsuka, 2001).

— **T. (T.) haliphron purahu* Kobayashi, 1987

Range.— Batuata.

T. (T.) criton Felder, 1860
(Halmahera Yellow Birdwing)

Range.— ?Sulawesi, northern Maluku (including Obi).

Foodplants.— *Aristolochia* (Aristolochiaceae). Matsuka (2001) illustrates the early stages (from N. Maluku).

Status.— Not known to be threatened, but protected in Indonesia.

— **T. (T.) criton celebensis* Wallace, 1865 [hybrid?]

Range.— Sulawesi.

— **T. (T.) criton selayarensis* Kobayashi & Koiwaya, 1981 [hybrid?]

Range.— Salayar.

Note.— According to Hancock (1983b) and Haugum (quoted in Collins & Morris, 1985), *celebensis* and *selayarensis* represent hybrids, *T. helena* x *T. haliphron*, and thus true *T. criton* is not represented in the Sulawesi Region. According to Matsuka (2001: 165), H. Detani confirmed hybrid status in 1994 by handpairing. However, it appears that relatively numerous specimens of '*celebensis*' have been collected in recent years (B. d'Abrera, pers. comm.), and it is not clear if these are the result of deliberate breeding or not. The status of these butterflies requires further investigation.

**T. (T.) dohertyi* Rippon, 1893
(Sangihe Yellow Birdwing)

Range (L).— Kep. Talaud (Salebabu, Karakelong, Kaburuang), Kep. Sangihe (Sangihe) (Matsuka, 2001).

Foodplants.— *Aristolochia* (Aristolochiaceae). Matsuka (2001) illustrates all stages.

Status.— Listed as vulnerable by Collins & Morris (1985) and Baillie & Groombridge (1996) on account of its very restricted range, and as Indeterminate by New & Collins (1991). Protected under Indonesian legislation (as subspecies of *rhadamantus*, a species otherwise restricted to the Philippines). Separation from *rhadamantus* is based on adult colour difference, and may not be justified (Matsuka, 2001).

Ornithoptera Boisduval, 1832
(birdwings — not illustrated)

Range.— ?Kep. Sula, Maluku, New Guinea, Bismarcks, Solomon Islands, Australia. All 12 species are protected under CITES.

Foodplants.— *Aristolochia*, but mainly *Pararistolochia* (Aristolochiaceae).

Key works.— d'Abrera (1975), Igarashi (1979), Haugum & Low (1980), Collins & Morris (1985), Parsons (1996a,b), Matsuka (2001).

O. croesus Wallace, 1859
(Wallace's Golden Birdwing)

Range.— ?Kep. Sula, northern Maluku. A member of the *priamus* species-group which, including *croesus*, is only confirmed to occur east of Weber's Line.

Foodplants.— *Pararistolochia* (Aristolochiaceae). Matsuka (2001) illustrates the early stages (from N. Maluku; see also Igarashi, 1979).

Status.— Vulnerable (Collins & Morris, 1985).

— **O. croesus sananaensis* Tsukada & Nishiyama, 1980

Range.— ?Kep. Sula (Sanana).

Note.— Almost certainly recorded in error (see Haugum & Low, 1981; Matsuka, 2001: 349), this taxon is probably based on an aberrant specimen from N Maluku (H. Detani, pers. comm. to A. Rawlins; Peggie *et al*., in prep.).

There exists much disagreement about the taxonomy of the next three genera (see Parsons, 1999: 218). Here we follow the arrangement proposed by Häuser *et al.* (2001).

Atrophaneura Reakirt, 1865
(batwings — Pl. 3, figs 3, 4, 7, 8)

Range (1+2+6+7).— Nepal to Assam and Indo-China, Sundaland, Taiwan, Philippines and Sulawesi; 12 species.

Note.— Hancock (1988) treats this genus as the *nox* species group of *Atrophaneura (Atrophaneura)*.

Foodplants.— *Aristolochia, Pararistolochia, Thottea* (Aristolochiaceae), Piperaceae.

Key works.— Tsukada & Nishiyama (1982), Hancock (1983b, 1988), Collins & Morris (1985), Miller (1987), Parsons (1996a,b).

**A. kuehni* Honrath, 1886
(Kuehn's Batwing — Pl. 3, figs 7, 8)

Range (E).— Sulawesi.

Foodplants.— *Thottea* (Aristolochiaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

Status.— ?Rare (Collins & Morris, 1985); insufficiently known (New & Collins, 1991).

— **A. kuehni mesolamprus* Rothschild, 1908

Range.— Sulawesi (N).

— **A. kuehni kuehni* Honrath, 1886

Range.— Sulawesi (C, E).

**A. dixoni* Grose Smith, 1901
(Dixon's Batwing — Pl. 3, figs 3, 4)

Range (E).— Sulawesi (N, C).

Status.— ?Rare (Collins & Morris, 1985); insufficiently known (New & Collins, 1991).

Losaria Moore, [1902]
(clubtails — Pl. 3, fig. 6)

Range (1+6+7).— Assam and Hainan, south to the Andamans and Nicobars, Greater Sunda Islands, Palawan and Sulawesi. Subgenus *Losaria* includes just four species, none of which is found in the Philippines or to the east of Sulawesi. A single endemic occurs on Sulawesi (Hancock, 1984), included by Miller (1987) in *Pachliopta (Losaria)*. Hancock (1988), however, placed *Losaria* as a synonym of *Atrophaneura* subgenus *Pachliopta*.

Foodplants.— *Aristolochia, Thottea* (Aristolochiaceae), Piperaceae.

Key works.— Tsukada & Nishiyama (1982), Hancock (1983b, 1988), Collins & Morris (1985), Miller (1987), Parsons (1996a,b).

**L. palu* Martin, 1912
(Sulawesi Clubtail — Pl. 3, fig. 6)

Range (E).— Sulawesi (C - Palu district).

Status.— Insufficiently known (Collins & Morris, 1985; Baillie & Groombridge, 1996). See New & Collins (1991).

Pachliopta Reakirt, [1865]

(roses — Pl. 3, fig. 2)

Range (W).— Mainly Oriental, but extending as far as N Queensland; 16 species.

Note.— Hancock (1988) treats *Pachliopta* as a subgenus of *Atrophaneura*.

Foodplants.— *Aristolochia, Thottea* (Aristolochiaceae).

Key works.— Tsukada & Nishiyama (1982), Hancock (1983b, 1988), Collins & Morris (1985), Miller (1987), Page & Treadaway (1995), Parsons (1996a,b).

P. polyphontes Boisduval, 1836

(Sulawesi Rose — Pl. 3, fig. 2)

Range (3).— Sulawesi Region, northern and ?central Maluku (?Seram: J. Weintraub, pers. comm.).

Note.— No record for central Maluku is confirmed by Page & Treadaway (1995), who interestingly suggest that *P. polyphontes* is most closely related to the Philippine species, *P. kotzebuea* Eschscholtz.

Foodplants.— *Aristolochia* (Aristolochiaceae). Igarashi & Fukuda (1997) illustrate all life stages.

Status.— Not known to be threatened.

— **P. polyphontes polyphontes* Boisduval, 1836

Range.— Sulawesi, Kep. Sangihe, Kep. Talaud, Wowoni, Muna, Kabaena (Jurriaanse & Lindemans, 1920)

— **P. polyphontes aipytos* Fruhstorfer, 1908

Range.— Kep. Banggai (Peleng), Kep. Sula (Taliabu, Mangole, Sanana), ?Kasiruta (Fujioka *et al.*, 1997).

— **P. polyphontes rosea* Oberthür, 1879

Range.— Salayar.

P. adamas Zinken 1831

(Zinken's Rose)

Range (P).— Enganno, Java, Kangean, Bawean, Tanahjampea, western Lesser Sunda Islands, from Bali to Flores (see Page and Treadaway, 1995, who have only recently separated this taxon from *P. aristolochiae* Fabricius).

Foodplants.— Probably *Aristolochia, Thottea* (Aristolochiaceae).

Status.— Not threatened.

— **P. adamas agricola* Tsukada & Nishiyama, 1980

Range.— Tanahjampea.

Papilionini Latreille, [1802]

(mimes, helens, mormons, peacocks and swallowtails — Pl. 4)

Range.— Cosmopolitan; about 210 species in three genera, two of which occur in Sulawesi.

Foodplants.— Approximately 30 families of flowering plants, the most important being: Apiaceae, Lauraceae, Magnoliaceae, Rutaceae.

Key works.— Hancock (1983b, 1993), Collins & Morris (1985), Miller (1987).

Chilasa Moore, [1881]
(mimes — Pl. 4, fig. 2)

Range (1+2+5+6+7).— Oriental Region, extending east to Philippines, Sulawesi and Lesser Sunda Islands, absent from the Moluccas, but recurs in New Guinea, Bismarck Archipelago and the Solomon Islands. Thirteen species recognised in two subgenera, of which one is restricted to China and Taiwan.

Foodplants.— Lauraceae (*Cinnamomum, Cryptocarya, Litsea*).

Chilasa (*Chilasa*) Moore, [1881]

Range.— As genus; 11 species in 4 groups, of which the single, endemic species found on Sulawesi represents the *veiovis*-group, otherwise only known from two Philippine species (Mindanao and Leyte).

Foodplants.— As genus.

**C. (C.) veiovis* Hewitson, 1865
(Sulawesi Mime — Pl. 4, fig. 2)

Range (E).— Sulawesi (see Roos, 1995)

Status.— Not known to be threatened.

Papilio Linnaeus, 1758
(helens, mormons, peacocks and swallowtails — Pl. 4)

Range (W).— Cosmopolitan; about 195 species, divided into 9 subgenera of which three occur in the Sulawesi Region.

Note.— Hancock (1983b) divided *Papilio* into six genera, with two of these divided into two subgenera, and a third with four subgenera. Collins & Morris (1985) recognised Hancock's six full genera as subgenera, and treated all his subgenera as synonyms. The classification adopted here is that of Häuser *et al.* (2001), with a total of nine subgenera, three of which occur in the Sulawesi Region.

Foodplants.— As tribe.

Key works.— Igarashi (1979), Tsukada & Nishiyama (1982), Hancock (1983b), Collins & Morris (1985).

Papilio (*Achillides*) Hübner, [1819]
(peacocks — Pl. 4, figs 5, 8)

Range.— About 25 species, mainly in Oriental Region, but extending into E Palaearctic, and eastward to Solomon Islands, Australia and New Caledonia.

Foodplants.— Rutaceae.

**P. (A.) blumei* Boisduval, 1836
(Blume's Peacock — Pl. 4, fig. 5)

Range (E).— Sulawesi. This outstandingly beautiful insect is an endemic member of the *palinurus*-group, which comprises five species distributed from Sri Lanka

to Sumatra, Borneo and the Philippines.

Foodplants.— *Euodia, Toddalia* (Rutaceae). Igarashi (1994) and Igarashi & Fukuda (2000) illustrate larvae and pupae.

Status.— Not known to be threatened (Collins & Morris, 1985); insufficiently known (New & Collins, 1991).

— **P. (A.) blumei blumei* Boisduval, 1836

Range.— Sulawesi (N, C, SE; see also Roos, 1993).

— **P. (A.) blumei fruhstorferi* Röber, 1897

Range.— Sulawesi (S).

P. (A.) peranthus Fabricius, 1787

(Swift Peacock — Pl. 4, fig. 8)

Range (5+6).— Java, Bawean, Lesser Sunda Islands (to Alor), and Sulawesi Region. The *peranthus*-group currently includes four species, distributed from Java to Tanimbar, Sulawesi, the Moluccas and Irian Jaya.

Note.— The Sulawesi Region races grouped here under *peranthus* are much larger than *peranthus* from Java and the Lesser Sundas, and may eventually prove to represent a separate, endemic species (Collins & Morris, 1985). In northern Sulawesi this species can often be seen flying along streams and valleys in rapid flight, but is far less often encountered on damp sand than *P. blumei*.

Foodplants.— *Micromelum* (Rutaceae). Early stages and hostplant illustrated from Sulawesi by Igarashi (1979) and Igarashi & Fukuda (2000).

Status.— not known to be threatened.

— **P. (A.) peranthus adamantius* Felder & Felder, 1864

Range.— Sulawesi (N).

— **P. (A.) peranthus insulicola* Rothschild, 1896

Range.— Sulawesi (S, ?C — Kitahara, 1989), Salayar.

— **P. (A.) peranthus* subsp. (Roos, 1993)

Range.— Sulawesi (SE).

— **P. (A.) peranthus intermedius* Snellen, 1890

Range.— Tanahjampea, Kalao, Bonerate.

— **P. (A.) peranthus kransi* Jurriaanse & Lindemans, 1920

Range.— Buton.

— **P. (A.) peranthus wangiwangiensis* Kitahara, 1989

Range.— Kep. Tukangbesi (Wangiwangi)

Note.— Kitahara (1989) did not compare his new taxon with subspecies *kransi*, but only with mainland *peranthus*.

***Papilio (Menelaides)* Hübner, [1819]**

(helens, mormons and swallowtails — Pl. 4, figs 1, 3, 4, 6, 7)

Range.— Oriental and Australian Regions, slightly extending to temperate Asia. Nearly 60 species, divided amongst 10 species-groups, 10 and 5 of which respectively are found in the Sulawesi Region.

Foodplants.— Rubiaceae, Rutaceae.

**P. (M.) gigon* Felder & Felder, 1864
(Sulawesi Banded Swallowtail — Pl. 4, fig. 7)

Range (R).— Sulawesi Region. One of the four members of the *demolion*-group, distributed from Asia to the Papuan Region, including the Philippines but not the Lesser Sunda Islands.

Foodplants.— *Citrus, Euodia, Glycosmis* (Rutaceae). Igarashi & Fukuda (1997) illustrate all life stages (see also Igarashi, 1979).

Status.— Not known to be threatened.

— **P. (M.) gigon gigon* Felder & Felder, 1864
Range.— Sulawesi, Kep. Sangihe (Siao).

— **P. (M.) gigon neriotes* Rothschild, 1908
Range.— Kep. Talaud, Kep. Sangihe (Sangihe).

— **P. (M.) gigon mangolinus* Fruhstorfer, 1899
Range.— Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana, Taliabu).

**P. (M.) sataspes* Felder & Felder, 1864
(Sulawesi Red Helen — Pl. 4, fig. 6)

Range (R).— Sulawesi Region. Endemic representative of the *helenus*-group (about eight species), found from Asia to the Philippines, Sulawesi and the Lesser Sunda Islands, but not in the Moluccas or New Guinea.

Foodplants.— *Euodia*, *Micromelum*, *Toddalia* (Rutaceae) (Igarashi & Fukuda, 2000, who also illustrate the early stages).

Status.— Not known to be threatened.

— **P. (M.) sataspes sataspes* Felder & Felder, 1864
Range.— Sulawesi.

— **P. (M.) sataspes artaphernes* Honrath, 1886
Range.— Kep. Banggai (Banggai, Peleng).

— **P. (M.) sataspes ahasverus* Staudinger, 1895
Range.— Kep. Sula (Sanana).

P. (M.) hipponous Felder & Felder, 1862

Range (P).— Philippines (Haugum & Collins, 1987; Treadaway, 1995), Kep. Talaud, Kep. Sangihe, ?Sulawesi.

Foodplants.— *Citrus* (Rutaceae). Ae (1977) described the early stages.

Status.— Insufficiently known (New & Collins, 1991).

P. (M.) fuscus Goeze, 1779
(Blue Helen)

Range (3+4+5).— Lesser Sunda Islands (including Bali), Sulawesi Region, N & C Maluku, New Guinea region, Australia, Solomon Islands, Vanuatu. The *fuscus* complex consists of three allopatric species (Hancock, 1983a, 1985, 1992) distributed from Asia to Vanuatu.

Foodplants.— *Morinda* (Rubiaceae); *Bosistoa, Citrus, Clausena, Euodia, Fagara, Geijera, Glycosmis, Halfordia, Microcitrus, Micromelum, Murraya, Zanthoxylum* (Rutaceae). Igarashi & Fukuda (2000) illustrate eggs, larvae and pupae (see also Igarashi, 1979).

Status.— Not known to be threatened.

— **P. (M.) fuscus minor* Oberthür, 1879
Range.— Sulawesi (N), Kep. Sangihe (Sangihe, Siao).
— **P. (M.) fuscus pertinax* Wallace, 1865
Range.— Sulawesi (S, SE: Roos, 1995), Kabaena. Jurriaanse & Lindemans (1920) suggested that a separate subspecies may fly on Kabaena, but the three females in Coll. Jurriaanse in the Leiden Museum, although variable in the extension of white on the hindwing, do not warrant separation (see also Roos, 1995).
— **P. (M.) fuscus lunifer* Rothschild, 1895
Range.— Kep. Talaud (Salebabu, ?Karakelong).
— **P. (M.) fuscus porrothenus* Jordan, 1909
Range.— Sulawesi (SW), Kalao, Tanahjampea, ?Salayar.
— **P. (M.) fuscus wasiensis* Hanafusa, 1991
Range.— Kep. Tukangbesi (Wangiwangi).
— **P. (M.) fuscus metagenes* Fruhstorfer, 1904
Range.— Kep. Tukangbesi (Binongko).
— **P. (M.) fuscus talyabona* Joicey & Talbot, 1932
Range.— Kep. Sula (Mangole, Sanana).

P. (M.) alphenor Cramer, 1776
(Philippine Mormon)

Range (1+2+3+4).— Philippines (including Palawan), Palau Islands, Kep. Talaud, Kep. Sangihe, Kep. Sula, N & C Maluku, Misool, ?New Guinea (not noted by Parsons, 1999). This and the next two species belong to the *polytes*-group, five species with a combined distribution ranging from Sri Lanka to the Solomon Islands.

Status.— Not known to be threatened.

— **P. (M.) alphenor perversus* Rothschild, 1895 (= *P. polytes alpheios* Jordan, 1909, see Moonen, 1998)
Range: Sulawesi (N), Kep. Talaud, Kep. Sangihe.
— **P. (M.) alphenor polycritos* Fruhstorfer, 1901
Range: Kep. Banggai (Peleng), Kep. Sula (Taliabu, Sanana).

P. (M.) polytes Linnaeus, 1758
(Common Mormon)

Range (5+6+7).— Sri Lanka, India, Indo-China, China, Ryukyu Islands, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Batan Islands only), Sulawesi Region.

Foodplants.— *Aegle, Atalantia, Citrus, Clausena, Euodia, Fortunella, Glycosmis, Micromelum, Murraya, Paramignya, Poncirus, Toddalia, Triphasia, Zanthoxylum* (Rutaceae). Igarashi (1979) and Bascombe *et al.* (1999) illustrate the early stages.

Status.— Common.

— **P. (M.) polytes alcindor* Oberthür, 1879
Range.— Sulawesi (N, C, S, SE), Kabaena, Buton, Salayar. See Moonen (1998).
— **P. (M.) polytes tucanus* Jordan, 1909
Range.— Kep. Tukangbesi (Binongko, Kaledupa).

**P. (M.) jordani* Fruhstorfer, 1906
(Jordan's Mormon — Pl. 4, figs 3, 4)

Range (E).— Sulawesi (N).

Note.— The females of this rare species look and fly remarkably like the danaine *Idea blanchardii* (Pl. 16, fig. 2), with which they occur locally in the Minahassa Peninsula (RIVW, pers. obs.).

Status.— Listed as rare by Collins & Morris (1985), and as vulnerable by Baillie & Groombridge (1996). See New & Collins (1991).

P. (M.) rumanzovia Eschscholtz, 1821
(Red Mormon)

Range (P).— Philippines (excluding Balabac, and central and southern Palawan: see Treadaway, 1995), Kep. Talaud, Kep. Sangihe (Sangihe, Siao). This and the next 2 species belong to the *memnon*-group, 13 species with a collective range from India to the Philippines, Sulawesi, Moluccas and Lesser Sunda Islands.

Foodplants.— *Atalantia*, *Citrus* (Rutaceae).

Status.— Not known to be threatened.

P. (M.) memnon Linnaeus, 1758
(Great Mormon)

Range (P).— North-east India, Indo-China, China, Taiwan, southern Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands (to Alor), Borneo, Kangean, Kalao, ?Maluku (?Obi: *P. memnon nestor* Talbot, 1929; ?Ambon).

Note.— A recently introduced hybrid "race" of *P. memnon* is now widespread in C Maluku; Andrew Rawlins, pers. comm.).

Foodplants.— *Aristolochia* (Aristolochiaceae); *Magnolia, Michelia* (Magnoliaceae); *Atalantia*, *Citrus, Fortunella, Paramignya, Poncirus, Severinia, Toddalia, Zanthoxylum* (Rutaceae). Igarashi (1979) and Bascombe *et al.* (1999) illustrate the early stages.

Status.— Not threatened.

— **P. (M.) memnon kalaomemnon* Hachitani, 1987

Range.— Kalao.

**P. (M.) ascalaphus* Boisduval, 1836
(Sulawesi Blue Mormon — Pl. 4, fig. 1)

Range (R).— Sulawesi Region.

Foodplants.— *Citrus* (Rutaceae). Igarashi (1979) illustrates the early stages.

Status.— Not known to be threatened.

— **P. (M.) ascalaphus ascalaphus* Boisduval, 1836

Range.— Sulawesi, Salayar, Buton (Fujioka *et al.*, 1997).

— **P. (M.) ascalaphus munascalaphus* Hachitani, 1988

Range.— Muna.

— **P. (M.) ascalaphus fukuyamai* Detani, 1983

Range.— Kep. Banggai (Peleng) (Fujioka *et al.*, 1997, record material from Peleng as nominate subspecies).

— **P. (M.) ascalaphus ascalon* Staudinger, 1895

Range.— Kep. Sula (Sanana).

Papilio (Princeps) Hübner, [1807]

(swallowtails — not illustrated)

Range.— 19 Species divided amongst 6 species groups. Afrotropical except one invasive species occurring from the Arabian Peninsula eastward through the Oriental and Australian Regions, and into the Pacific (Hawaii and possibly other Pacific islands).

Foodplants.— As genus, but not including Apiaceae.

P. (Pr.) demoleus Linnaeus, 1758

(Lime, Lemon, or Chequered Swallowtail)

Range (1+2+5+6+7).— Arabia, Afghanistan, Oriental and Australian Regions, including Malay Peninsula, Sumatra, Java (Kato, 1989; sporadic introduction? - see Moonen, 1991), Lesser Sunda Islands, Borneo (Otsuka, 1988), Palawan, Philippines, Irian Jaya (Moonen, 1999), Australia (Braby, 2000) and Papua New Guinea (Parsons, 1999; Igarashi & Fukuda, 2000), but absent from Maluku. In the Sulawesi Region, found in Kep. Sula, Kep. Sangihe, Kep. Talaud and, most recently, N Sulawesi. The other four species belonging to the *demoleus*-group occur in the Afrotropical Region, three being Madagascan endemics.

Foodplants.— *Cullen* (Australia; Braby, 2000; previously included in *Psoralea*), *Psoralea* (Fabaceae); *Fagraea* (Loganiaceae); *Michelia* (Magnoliaceae); *Ziziphus* (Rhamnaceae); *Acronychia, Aegle, Atalantia, Chloroxylon, Citrus* (cultivars!), *Clausena, Flindersia, Fortunella, Glycosmis, Limonia, Microcitrus, Micromelum, Murraya, Ruta, Zanthoxylum* (Rutaceae). Igarashi (1979) illustrates all life stages.

Status.— Common.

— *P. (Pr.) demoleus libanius* Fruhstorfer, 1908

Range.— Taiwan, Philippines (including Palawan), Kep. Talaud, Kep. Sangihe (Sangihe; F. Kodong, pers. comm., 1988), Kep. Sula (Sanana), and Manado district of N Sulawesi, where it is now common (F. Kodong, pers. comm., 2002).

Leptocircini Kirby, 1896 (= Graphiini, = Lampropterini)

(kites, triangles, jays, swordtails and dragontails — Pl. 5)

Range.— Pantropics, with extensions into temperate regions; about 150 species in 7 genera, only 2 of which occur in the Sulawesi Region.

Foodplants.— Primarily Annonaceae; also Lauraceae, Rosaceae.

Key works.— Tsukada & Nishiyama (1982), Hancock (1983b, 1993), Collins & Morris (1985), Miller (1987).

Graphium Scopoli, 1777

(kites, triangles, jays and swordtails — Pl. 5, figs 1-6)

Range (W).— Palaeotropics, with weak extensions to temperate regions. About 100 species in 5 subgenera, 3 of which occur in Sulawesi.

Foodplants.— Predominantly Annonaceae and Lauraceae; also ?Apocynaceae, Aquifoliaceae, Atherospermataceae, Euphorbiaceae, Hernandiaceae, Magnoliaceae,

Monimiaceae, Myrtaceae, Rutaceae, Sapotaceae, Winteraceae.

Key works.— Saigusa *et al.* (1982), Tsukada & Nishiyama (1982), Collins & Morris (1985), Miller (1987), Hancock (1993).

Graphium (Graphium) Scopoli, 1777

(Pl. 5, figs 2-4, 6)

Range.— Indo-Australian region, extending to Japan. About 28 species (6 in Sulawesi) in 5 species groups (3 in Sulawesi).

Foodplants.— Range similar to genus.

G. (G.) codrus Cramer, 1779

(Eastern Olive Triangle — Pl. 5, fig. 6)

Range (2+3+4).— Philippines (excluding Palawan), Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands. This and the next two species are members of the *sarpedon*-group, ten species with a combined widespread distribution from Sri Lanka to Japan, New Caledonia and Tasmania. *G. empedovana* Corbet, which occurs throughout the Greater Sundas, is sometime included as a subspecies of *codrus* (see Collins & Morris, 1985).

Foodplants.— *Annona, Uvaria* (Annonaceae); *Hernandia* (Hernandiaceae); ?*Thespesia* (Malvaceae). Igarashi (1979) and Igarashi & Fukuda (2000) illustrate larvae and pupae.

Status.— Not known to be threatened.

— **G. (G.) codrus celebensis* Wallace, 1865

Range.— Sulawesi, Kep. Banggai (Peleng).

— **G. (G.) codrus taloranus* Jordan, 1909

Range.— Kep. Talaud.

— **G. (G.) codrus stiris* Jordan, 1909

Range.— Kep. Sula (Sanana).

**G. (G.) monticolus* Fruhstorfer, 1896

(Sulawesi Blue Triangle — Pl. 5, fig. 4)

Range (E).— Sulawesi.

Note.— Long treated as a subspecies of *G. sarpedon*, separation as a montane Sulawesi endemic appears justified (d'Abrera, 1982; Roos, 1993; Moonen, 1998; Parsons, 1999).

Foodplants.— According to Toxopeus (1950), can be bred on (literally) the same plant as *G. anthedon milon* - unfortunately he did not say what it was! Based on Igarashi & Fukuda (2000), possibly *Cinnamomum* (Lauraceae).

Status.— Not known to be threatened.

— **G. (G.) monticolus textrix* Tsukada & Nishiyama, 1980 (= *longilinea* Joicey & Talbot, 1922; = *longilineatus* Toxopeus, 1950; unavailable names)

Range.— Sulawesi (C).

Note.— d'Abrera (1982) regarded this as a straight synonym of *monticolus*, but the work of Toxopeus (1950) indicates that this is not the case. Superficial examination of museum material even suggests that the two taxa could represent separate species.

— **G. (G.) monticolus monticolus* Fruhstorfer, 1896

Range.— Sulawesi (S).

G. (G.) anthedon Felder & Felder, 1864 (= *milon*)
(Wallacea Bluebottle)

Note.— This species was long treated as a subspecies of *G. sarpedon*. Tsukada & Nishiyama (1980) recognised it as separate, under the name *G. milon* Felder & Felder, 1865, but this name is junior to *anthedon* Felder & Felder, 1864 (Kirby, 1871; Moonen, 1998). Application of Article 23.9 (ICZN, 1999) to conserve the use of *milon* by giving it precedence over *anthedon* does not appear justifiable, given the relative obscurity of this taxon.

Foodplants.— *Cinnamomum* (Lauraceae). Igarashi & Fukuda (2000) illustrate foodplant and early stages (as *G. milon*).

Range (3+4).— Sulawesi Region, N & C Maluku.

Status.— Not known to be threatened.

— **G. (G.) anthedon milon* Felder & Felder, 1865

Range.— Sulawesi, Kep. Talaud, Kabaena, Buton, Kep. Banggai (Peleng). Fujioka *et al.* (1997) include material from Peleng and Kep. Sangihe in the following subspecies.

— **G. (G.) anthedon coelius* Fruhstorfer, [May] 1899 (= *sulaensis* Lathy, June 1899)

Range.— Kep. Sula (Mangole, Sanana, Taliabu: Moonen, 1998).

G. (G.) eurypylus Linnaeus, 1758
(Pale Green Triangle, or Great Jay)

Range (W).— Northern India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Australia. This and the next species belong to the *eurypylus*-group, nine species which together have a widespread distribution extending from Sri Lanka to Japan, New Guinea and northern Australia.

Foodplants.— *Annona* (also on introduced and cultivated species), *Artabotrys, Desmos, Fitzalania, Melodorum, Miliusa, Mitrephora, Polyalthia, Pseuduvaria, Rauwenhoffia, Saccopetalum, Uvaria* (Annonaceae); in Thailand on *Michelia* (Magnoliaceae); in Australia also found on introduced *Magnolia* (Magnoliaceae). Igarashi & Fukuda (2000) illustrate eggs, larvae and pupae.

Status.— Not known to be threatened.

— **G. (G.) eurypylus pamphylus* Felder & Felder, 1865

Range.— Sulawesi.

— **G. (G.) eurypylus sangira* Oberthür, 1879

Range.— Kep. Sangihe.

— *G. (G.) eurypylus gordion* Felder & Felder, 1864

Range.— Philippines, Kep. Talaud.

— **G. (G.) eurypylus insularis* Rothschild, 1896

Range.— Salayar, Kalao, Tanahjampea.

— **G. (G.) eurypylus fumikoe* Detani, 1983

Range.— Kep. Banggai (Peleng).

— **G. (G.) eurypylus arctofasciatus* Lathy, 1899.

Range.— Kep. Sula (Sanana).

**G. (G.) meyeri* Hopffer, 1874
(Meyer's Triangle — Pl. 5, fig. 2)

Range (R).— Sulawesi Region.

Status.— Not known to be threatened.

— **G. (G.) meyeri meyeri* Hopffer, 1874
Range.— Sulawesi (see Roos, 1993), Kep. Banggai (Peleng).

— **G. (G.) meyeri extremum* Tsukada & Nishiyama, 1980
Range.— Kep. Sula (Sanana).

G. (G.) agamemnon Linnaeus, 1758
(Green-spotted Triangle, or Tailed Jay — Pl. 5, fig. 3)

Range (W).— Sri Lanka, India, southern China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Solomon Islands, northern Australia. *G. agamemnon* is the only widespread member of the *agamemnon*-group of subgenus *Graphium*, the other six members being completely restricted to the Papuan Region, to the east of Weber's Line.

Foodplants.— *Ancana, Annona* (also on introduced and cultivated species), *Artabotrys, Cyathostemma, Desmos, Fissistigma, Fitzalania, Goniothalamus, Guatteria, Haplostichanthus, Meiogyne, Melodorum, Miliusa, Mitrephora, Oncodostigma, Polyalthia, Pseuduvaria, Rauwenhoffia, Rollinia, Uvaria, Xylopia* (Annonaceae); *Durio* (Bombacaceae); *Dioscorea* (Dioscoreaceae); *Cassia* (Fabaceae); *Cinnamomum, Cryptocarya* (Lauraceae); *Elmerillia*, *Magnolia, Michelia* (Magnoliaceae); *Piper* (Piperaceae); *Citrus* (Rutaceae). Igarashi & Fukuda (2000) illustrate the early stages; see also Igarashi (1979) and Bascombe *et al.* (1999).

Status.— Common.

— **G. (G.) agamemnon comodus* Fruhstorfer, 1903
Range.— Throughout Sulawesi Region.

***Graphium (Pathysa)* Reakirt, 1865**
(swordtails and zebras — Pl. 5, fig. 5)

Range.— Oriental and Australian Regions. Collins & Morris (1985) recognised 23 species in two species groups, the *antiphates* group and the *macareus* group. These groups are recognised here as subgenus *Pathysa* and subgenus *Paranticopsis*, respectively. *Pathysa* includes about a dozen species, five of which occur in Sulawesi.

Foodplants.— Annonaceae, Lauraceae, Magnoliaceae.

**G. (Pat.) rhesus* Boisduval, 1836
(Monkey Swordtail)

Range (R).— Sulawesi Region.

Status.— Not known to be threatened.

— **G. (Pat.) rhesus rhesus* Boisduval, 1836
Range.— Sulawesi (N, ?C, E, SE — see Roos, 1993), Buton.

— **G. (Pat.) rhesus rhesulus* Fruhstorfer, 1902
Range.— Sulawesi (?C, S), Kep. Banggai (Peleng).

— **G. (Pat.) rhesus rhapia* Jordan, 1908
Range.— Tanahjampea, Kep. Tukangbesi.
— **G. (Pat.) rhesus* subsp. (Okano, 1988)
Range.— Kalao.
— **G. (Pat.) rhesus parvimacula* Joicey & Talbot, 1922
Range.— Kep. Sula (Sanana, Mangole).

**G. (Pat.) androcles* Boisduval, 1836
(Lion Swordtail)

Range (R).— Sulawesi Region.
Status.— Not known to be threatened.
— **G. (Pat.) androcles androcles* Boisduval, 1836
Range.— Sulawesi (see Roos, 1993).
— **G. (Pat.) androcles pelengensis* Detani, 1983
Range.— Kep. Banggai (Peleng).
— **G. (Pat.) androcles cleomenes* Fruhstorfer, 1911
Range.— Kep. Sula (Sanana).

**G. (Pat.) dorcus* de Haan, 1840
(Tabitha's Swordtail — Pl. 5, fig. 5)

Range (R).— Sulawesi, Buton.
Status.— Insufficiently known (Collins & Morris, 1985; New & Collins, 1991).
— **G. (Pat.) dorcus dorcus* de Haan, 1840
Range.— Sulawesi (N; see Haugum, 1988).
— **G. (Pat.) dorcus ventus* Tsukada & Nishiyama, 1980
Range.— Sulawesi (C).
— **G. (Pat.) dorcus butungensis* Hanafusa, 1997
Range.— Buton.

G. (Pat.) antiphates Cramer, 1775
(Five-bar Swordtail)

Range (5+6+7).— Sri Lanka, southern and northern India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, southern Sulawesi Region.

Foodplants.— *Annona, Desmos, Goniothalamus, Melodorum, Miliusa, Uvaria, Xylopia* (Annonaceae); *Michelia* (Magnoliaceae). Igarashi & Fukuda (2000) illustrate the early stages.

Status.— Not known to be threatened.
— **G. (Pat.) antiphates kurosawai* Igarashi, 1979
Range.— Sulawesi (C, S).
— *G. (Pat.) antiphates kalaoensis* Rothschild, 1896
Range.— Lesser Sunda Islands (Lombok to Alor), Kalao, Tanahjampea.

G. (Pat.) euphrates Felder & Felder, 1862
(Euphrates Swordtail)

Range (1+2+3).— Banggi (small island between Borneo and Balabac), Balabac,

Palawan, Philippines, Sulawesi, N Maluku (Halmahera and Bacan: Andrew Rawlins, pers. comm.). See Tsukada & Nishiyama (1982), Page (1987).

Foodplants.— Lauraceae.

Status.— Not known to be threatened.

— **G. (Pat.) euphrates elegantia* Tsukada & Nishiyama, 1980

Range.— Sulawesi (S).

Graphium (Paranticopsis) Wood-Mason & de Nicéville, 1887

(zebras — Pl. 5, fig. 1)

Range.— Oriental and Australian Regions. Only two species of this group (including one of the two species in Sulawesi) are found east of the Wallace Line. These eastern species do not occur beyond New Guinea. Collins & Morris (1985) distinguished the 12 species involved as the *macareus* group of the subgenus *Pathysa*.

Foodplants.— Aquifoliaceae (Hancock, 1983b).

**G. (Par.) encelades* Boisduval, 1836

(Sulawesi Zebra)

Range (R).— Sulawesi, Kep. Banggai (Peleng). Moonen (1998) illustrates the female.

Status.— Not known to be threatened.

G. (Par.) deucalion Boisduval, 1836

(Yellow Zebra — Pl. 5, fig. 1)

Range (3).— Sulawesi, Kep. Banggai, northern Maluku, Biak (Irian Jaya).

Note.— Inclusion of the Biak population (*felixi* Joicey & Noakes) within *G. deucalion* follows the novel suggestion of Hancock (1979), but Parsons (1999) appears to retain *felixi* as a subspecies of *G. thule* Wallace (from Waigeo and New Guinea).

Status.— Not known to be threatened.

— **G. (Par.) deucalion deucalion* Boisduval, 1836

Range.— Sulawesi.

— **G. (Par.) deucalion marabuntana* Detani, 1983

Range.— Kep. Banggai (Peleng).

Lamproptera Gray, 1832

(dragontails — Pl. 5, fig. 7)

Range (1+2+6+7).— Northeastern Indian Region, Indo-China and southern China south to Sumatra, Java, Philippines and Sulawesi Region. Two species only; both occur together throughout much of their range, except that *L. meges*, the species found in Sulawesi, exceeds the range of *L. curius* by extending through the Philippines proper to Sulawesi and Kep. Banggai.

Foodplants.— Hernandiaceae.

Key works.— Tsukada & Nishiyama (1982), Collins & Morris (1985).

L. meges Zinken, 1831

(Green Dragontail — Pl. 5, fig. 7)

Range (1+2+6+7).— Assam, Indo-China, Hainan, Malay Peninsula, Sumatra, Java,

Borneo, Palawan, Philippines, Sulawesi.

Foodplants.— *Illigera* (Hernandiaceae). In the Philippines also recorded from *Zanthoxylum* (Rutaceae). Igarashi & Fukuda (2000) illustrate eggs, larvae and pupae.

Status.— Not known to be threatened (in Indonesia).

— **L. meges ennius* Felder & Felder, 1865

Range.— Sulawesi (N, C, S, SE; see also Roos, 1993), Kep. Banggai (Peleng).

— **L. meges akirai* Tsukada & Nishiyama, 1980

Range.— Sulawesi (S).

Pieridae Swainson, 1831
(whites and sulphurs)

Range.— Cosmopolitan (about 1200 species, 60 genera); two major subfamilies (both represented in Sulawesi), and two minor subfamilies (both unrepresented in the Oriental and Australian Regions).

Foodplants.— More than 30 families of flowering plants, but primarily Asteraceae, Brassicaceae, Capparaceae, Fabaceae, Loranthaceae, Rhamnaceae, Santalaceae and Zygophyllaceae; Coniferales (one American genus).

Key works.— Klots (1933), d'Abrera (1982), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Yata (1981a), Bridges (1988a), Ackery (1989), Peggie *et al.* (1995).

Coliadinae Swainson, 1821
(sulphurs, yellows — Pl. 6, figs 2, 6, 14)

Range.— Cosmopolitan; more than 200 species, in about a dozen genera.

Foodplants.— Primarily Asteraceae, Fabaceae, Rhamnaceae and Zygophyllaceae; never Brassicaceae or Loranthaceae, a few records of Capparaceae.

Key works.— As family.

Gandaca Moore, 1906
(tree yellows — Pl. 6, fig. 6)

Range (W).— Oriental and Australian Regions, from Sikkim to New Guinea. Formerly treated as monobasic, Yata (1981a) recognised two allopatric species, with the Sulawesi Region populations belonging to the eastern taxon, while the distinctive but more easterly Kep. Banggai and Kep. Sula population belongs to the western taxon (Yamauchi & Yata, 2000). As Yamauchi & Yata point out, such a doubly disjunct distribution is unique.

Foodplants.— Annonaceae (*Monocarpia*, *Mitrephora*); Connaraceae (*Connarus*); Rhamnaceae (*Ventilago*).

Key works.— Corbet & Pendlebury (1992), Yata (1981a), Yamauchi & Yata (2000).

G. butyrosa Butler, 1875
(Eastern Tree Yellow — Pl. 6, fig. 6)

Range (2+3+4).— S Philippines (Dinagat, Mindanao), Sulawesi, N & C Maluku, Aru, Waigeo, New Guinea. Whether or not both species are truly sympatric in parts of S Philippines remains uncertain (Yamauchi & Yata, 2000).

— **G. butyrosa samanga* Fruhstorfer, 1910
Range.— Sulawesi (C, S).

G. harina Horsfield, 1829
(Tree Yellow)

Range (P).— Eastern India, southern China, Andamans, Peninsula Malaya, Sumatra, Java, Lesser Sundas, Borneo, Palawan, N & S Philippines, Kep. Banggai, Kep. Sula.

Foodplants.— *Mitrephora*, *Monocarpia* (Annonaceae); *Connarus* (Connaraceae); *Ventilago* (Rhamnaceae). Igarashi & Fukuda (2000) illustrate the life history.

— **G. harina auriflua* Fruhstorfer, 1898

Range.— Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana, Taliabu). Yamauchi & Yata (2000) speculate that *Gandaca* from N Sulawesi could also possibly belong to *harina*, but they were unable to obtain material from Sulawesi Utara for examination.

Eurema Hübner, 1819
(grass yellows — Pl. 6, fig. 2)

Range (W).— Cosmotropical, extending weakly into temperate regions. A large genus with well over 60 species (about half of which occur in the Old World) and currently divided into just two subgenera, both represented in Sulawesi.

Foodplants.— Apocynaceae, Asteraceae, Connaraceae, Cucurbitaceae, Euphorbiaceae, Fabaceae, Hypericaceae, Osmundaceae, Palmae, Rhamnaceae, Rubiaceae, Santalaceae, Simaroubaceae, Theaceae, Verbenaceae.

Key works.— Holloway (1973), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Yata (1981a, 1988, 1989, 1991, 1992, 1994, 1995).

Eurema (Eurema) Hübner, 1819

Range.— As genus but primarily Neotropical, with only four Old World species. Of these, one is purely Afrotropical and another is Australian. Of the two species widespread in the Indo-Australian tropics, only one occurs on Sulawesi.

Foodplants.— As genus.

E. (E.) brigitta Stoll, 1780
(No-brand Grass Yellow)

Range (2+3+4+5+6+7).— palaeotropics, from West Africa to Madagascar, Sri Lanka, China and Taiwan, Malay Peninsula, Sumatra, Java, Borneo (Otsuka, 1991), Philippines (Luzon, Mindanao, Siquijor: only in clearings - see Treadaway, 1995), Lesser Sunda Islands, Sulawesi, Palau islands, northern and central Maluku to New Guinea, eastern Australia and Fiji.

Foodplants.— *Adenanthera, Albizia, Cassia, Chamaecrista, Desmodium, Erioglossum, Neptunia, Pithecolobium , Senna, Sesbania* (Fabaceae); *Hypericum* (Hypericaceae). The life history has been described by Bascombe *et al*. (1999) for the Hong Kong population, and by Henning *et al*. (1997) for southern Africa.

— **E. (E.) brigitta ina* Eliot, 1956

Range.— Sulawesi, Muna. Yata (1989) gives S. Sulawesi only.

Eurema (Terias) Swainson, 1821

Range.— Palaeotropics, particularly the Oriental Region. Nearly 30 species, divided by Yata (1988, 1989) into 5 species groups; Sulawesi has 6 species, representing 2 of these groups.

Foodplants.— As genus.

E. (T.) hecabe Linnaeus, 1758
(Common Grass Yellow)

Range (W).— Palaeotropics, from West Africa to Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, eastern Australia, Solomons, New Caledonia, Fiji, etc. This and the next three species all belong to the *hecabe*-group, an assemblage totalling eight species with a collective distribution comparable to the subgenus as a whole.

Foodplants.— *Alstonia* (Apocynaceae); *Solidago* (Asteraceae); *Connarus* (Connaraceae); *Bryonia* (Cucurbitaceae); *Breynia, Bridelia, Phyllanthus* (Euphorbiaceae); *Abrus, Acacia, Aeschynomene, Albizia, Alstonia, Arachis, Archidendron, Caesalpinia, Cassia, Chamaecrista, Delonix, Entada, Galactia, Gleditsia, Indigofera, Kummerowia, Lespedeza, Leucaena, Macrotropis, Medicago, Mimosa, Moullava, Ormocarpum, Paraserianthes, Parkia, Pithecellobium, Pterocarpus, Robinia, Senna, Sesbania, Smithia, Trigonella, Wagatea* (Fabaceae); *Cratoxylon* (Hypericaceae); *Osmunda* (Osmundaceae); *Cocos* (Palmae); *Phyllanthus, Rhamnus, Sageretia*, *Ventilago* (Rhamnaceae); *Coffea* (Rubiaceae); *Santalum* (Santalaceae); *Camellia* (Theaceae); *Tectona* (Verbenaceae). Igarashi & Fukuda (2000) illustrate egg, larva and pupa.

— **E. (T.) hecabe latimargo* Hopffer, 1874

Range.— Sulawesi (N, C), Buton, Muna. According to Yata (1995), "this subspecies is restricted to North and West Sulawesi".

— **E. (T.) hecabe sinda* Fruhstorfer, 1910

Range.— Sulawesi (S).

— **E. (T.) hecabe pylos* Fruhstorfer, 1910

Range.— Kep. Banggai (Banggai, Peleng), Kep. Sula (Mangole, Sanana).

— **E. (T.) hecabe dentyris* Fruhstorfer, 1910

Range.— Salayar, Tanahjampea. According to Yata (1995), the type specimen of *dentyris* may represent *E. alitha* (subspecies *djampeana*); the correct placement of material from Salayar now seems open to doubt - it may also belong to *alitha*.

— **E. (T.) hecabe kalidupa* Fruhstorfer, 1910

Range.— Kep. Tukangbesi (Kaledupa, Tomea; Yata, 1995, gives only Kaledupa).

E. (T.) alitha Felder & Felder, 1862

Range (W).— Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Taiwan, Sulawesi Region, N & C Maluku, New Guinea. The work of Kitamura (1996) suggests that true *alitha* may not extend further north than Mindanao in the Philippines.

Foodplants.— *Albizia, Cassia, Desmanthus, Entada, Galactia, Glycine, Ormocarpum, Pithecellobium, Senna* (Fabaceae); *Rhamnus* (Rhamnaceae). The early stages are illustrated by Igarashi & Fukuda (2000).

— **E. (T.) alitha zita* Felder & Felder, 1865
Range.— Sulawesi (N, C), Kep Banggai (Peleng), ?Kep. Sula (Yata, 1988, 1995).
— **E. (T.) alitha lorquini* Felder & Felder, 1865
Range.— Sulawesi (S).
— **E. (T.) alitha* subsp. (Jurriaanse & Lindemans, 1920)
Range.— Sulawesi (SE), Kabaena, Muna, Masalaka, Buton, Kep. Tukangbesi (Kaledupa, Tomea).
Note.— Yata (1995) does not list *alitha* from these islands.
— **E. (T.) alitha sangira* Fruhstorfer, 1910
Range.— Kep. Sangihe (Sangihe).
— **E. (T.) alitha* subsp. (ZSBS, de Jong *in litt.*)
Range.— Salayar. Yata (1995) does not list *E. alitha* from Salayar.
— **E. (T.) alitha djampeana* Fruhstorfer, 1908
Range.— Tanahjampea.

E. (T.) blanda Boisduval, 1836
(Three-spot Grass Yellow)

Range (W).— Oriental and Australian Regions, from Sri Lanka to Solomons, including Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku and New Guinea.

Foodplants.— *Alstonia* (Apocynaceae); *Acacia, Acrocarpus, Agati, Albizia, Alstonia, Archidendron, Caesalpinia, Cassia, Delonix, Gelditsia, Gliricidia, Guilandina, Macrotropis, Moullava, Ormosia, Parkia, Paraserianthes, Pithecellobium, Senna, Sesbania, Wagatea, Xylia* (Fabaceae); *Camellia* (Theaceae), *Agatea* (Violaceae). Igarashi & Fukuda (2000) illustrate eggs, larvae and pupae.
— **E. (T.) blanda norbana* Fruhstorfer, 1910
Range.— Sulawesi (N, C), Kep. Talaud (Peggie *et al*., 1995 - but Yata, 1994, does not mention Talaud), Kep. Sangihe (Yata, 1994), Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana).
— **E. (T.) blanda odinia* Fruhstorfer, 1910
Range.— Sulawesi (S), Buton (but Yata, 1994, does not mention Buton).

**E. (T.) irena* Corbet & Pendlebury, 1932
Range (E).— Sulawesi (C).
Note.— Formally raised to full species status by Yata (1994).

**E. (T.) celebensis* Wallace, 1867
Range (R).— Sulawesi Region. This and the next species belong to the *sari*-group, 18 species restricted to the Indo-Australian region.
— **E. (T.) celebensis celebensis* Wallace, 1867
Range.— Sulawesi, ?Kep. Sangihe.
Note.— According to Yata (1991), the nominate race is confined to the main island of Sulawesi - he does give any record of the species from Kep. Sangihe.
— **E. (T.) celebensis exophthalma* Fruhstorfer, 1910
Range.— Kep Banggai (Peleng), Kep. Sula (Mangole, Sanana).

E. (T.) tominia Vollenhoven, 1865
(Pl. 6, fig. 2)

Range (7).— Borneo, Sulawesi Region.

Foodplants.— Yata (1992) cites old literature indicating that the hostplant is a tall tree belonging to the Fabaceae.

— **E. (T.) tominia tominia* Vollenhoven, 1865
Range.— Sulawesi.

— **E. (T.) tominia theristra* Fruhstorfer, 1911
Range.— Kep. Sangihe (Sangihe).

— **E. (T.) tominia talissa* Westwood, 1888
Range.— Talisei, Kep. Sangihe (Siao).

— **E. (T.) tominia halesa* Fruhstorfer, 1910
Range.— Salayar.

— **E. (T.) tominia arsia* Fruhstorfer, 1910
Range.— Tanahjampea and Kalao (Yata 1992).

— **E. (T.) tominia faunia* Fruhstorfer, 1910
Range.— Kep. Tukangbesi (?Kaledupa, ?Tomea).

— **E. (T.) tominia mangolina* Fruhstorfer, 1910
Range.— Kep Banggai (Peleng), Kep. Sula (Mangole, Sanana; Yata, 1992, adds ?Taliabu).

Catopsilia Hübner, 1819
(emigrants — Pl. 6, fig. 14)

Range (W).— Palaeotropics. Four species in the Indo-Australian region, all widespread and found on Sulawesi except one confined to Australia.

Foodplants.— Fabaceae; there are scattered records on Araceae, Capparaceae and Thymelaeaceae.

Key works.— Corbet & Pendlebury (1992), Common & Waterhouse (1981), Yata (1981a).

C. scylla Linnaeus, 1763
(Orange Emigrant)

Range (W).— Burma, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, ?New Guinea, Bismarcks, northern Australia, New Caledonia and Fiji.

Foodplants.— *Crateva* (Capparaceae); *Cassia, Senna, Tephrosia* (Fabaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— *C. scylla asema* Staudinger, 1885
Range.— central and southern Philippines, Sulawesi, Salayar, Kalao, Kabaena, Buton, Kep. Tukangbesi (Kaledupa).

— **C. scylla bangkejana* Fruhstorfer, 1903
Range.— Kep. Banggai (Peleng), Kep. Sula (Sanana).

C. pyranthe Linnaeus, 1758
(Mottled Emigrant)

Range (1+2+4+5+6+7).— Oriental and Australian Regions, from Sri Lanka to Tai-

wan, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, C Maluku (Yata, 1981a; Peggie *et al.*, 1995), Solomon Islands, New Caledonia, northern and eastern Australia. Not recorded from New Guinea.

Foodplants.— *Colocasia* (Araceae); *Crateva* (Capparaceae); *Cassia, Crotalaria, Ormocarpum, Paraserianthes, Senna, Sesbania* (Fabaceae); *Gnidia* (Thymelaeaceae). Igarashi & Fukuda (1997) illustrate the early stages.

— *C. pyranthe pyranthe* Linnaeus, 1758

Range.— Sri Lanka, India, Indo-China, southern China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines, Sulawesi, Kep. Sula (Sanana), Maluku (Seram, Ambon).

C. pomona Fabricius, 1775

(Lemon Emigrant — Pl. 6, fig. 14)

Range (W).— Sri Lanka, India, Indo-China, southern China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Solomon Islands, New Caledonia, Australia.

Foodplants.— *Bauhinia, Brownea, Butea, Cassia, Pterocarpus, Senna, Sesbania* (Fabaceae). Igarashi & Fukuda (1997) illustrate the early stages.

— **C. pomona flava* Butler, 1869

Range.— Sulawesi, Salayar, Tanahjampea, Kalao, Kabaena, Muna (Galla), Buton, Kep. Tukangbesi (Tomea), Kep. Banggai (Peleng).

— **C. pomona dionysiades* Fruhstorfer, 1911

Range.— Kep. Talaud, Kep. Sangihe (Sangihe, Siao).

— *C. pomona rivalis* Fruhstorfer, 1910

Range.— Kep. Sula (Mangole, Sanana), N & C Maluku, New Guinea region, Solomon Islands, Vanuatu, New Caledonia, Australia.

Pierinae Swainson, 1831 (1821)

(whites, orange tips, jezebels — Pl. 6, figs 1, 3-5, 7-13)

Range.— Cosmopolitan; about 900 species in more than 50 genera.

Foodplants.— Primarily Brassicaceae, Capparaceae, Euphorbiaceae, Loranthaceae, Resedaceae, Santalaceae, Tropaeolaceae; very rarely Fabaceae, Rhamnaceae, Asteraceae or Zygophyllaceae.

Key works.— As family.

***Hebomoia* Hübner, 1819**

(giant orange tips — Pl. 6, fig. 5)

Range (W).— Oriental Region, eastwards to Lesser Sunda Islands, Philippines, Sulawesi Region and Maluku. Despite the superficial resemblance to *Ixias* and *Colotis*, Klots (1933) considered *Hebomoia* to be unrelated to these genera. Two species are currently recognised, one predominantly western and widespread, represented on Sulawesi, the other eastern, being restricted to central Maluku and eastern Sulawesi Region (Kep. Banggai).

Foodplants.— Brassicaceae, Capparaceae.
Key works.— Yata (1981a).

H. glaucippe Linnaeus, 1758
(Great Orange Tip — Pl. 6, fig. 5)

Range (1+2+3+5+6+7).— Sri Lanka, India, Indo-China, China, Ryukyu Islands, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, northern Maluku.

Foodplants.— *Brassica* (Brassicaceae); *Capparis, Crateva* (Capparaceae). Igarashi & Fukuda (1997) illustrate the early stages.

— **H. glaucippe celebensis* Wallace, 1863
Range.— Sulawesi, Kep. Talaud, Salayar, Kalao, Tanahjampea, Buton, Kep. Banggai (Peleng).

— **H. glaucippe uedai* Morita, 1996
Range.— Kep. Banggai (Salue Is.).

— **H. glaucippe sangirica* Fruhstorfer, 1911
Range.— Kep. Sangihe.

— **H. glaucippe sulaensis* Fruhstorfer, 1908
Range.— Kep. Sula (Mangole, Sanana).

H. leucippe Cramer, 1775
Range (P).— Kep. Banggai, central Maluku.

— **H. leucippe detanii* Nishimura, 1983
Range.— Kep. Banggai (Peleng).

***Pareronia* Bingham, 1907**
(wanderers — Pl. 6, fig. 1)

Range (W).— Mainly Oriental Region, from Sri Lanka to the Philippines and Flores, but with two species in the Moluccas, one of which (or a separate species) also occurs on Biak. A genus of about a ten species, represented in the Sulawesi Region by a single but highly polytypic endemic.

Foodplants.— Capparaceae (*Capparis*).
Key works.— Corbet & Pendlebury (1992), Yata (1981a).

— **P. tritaea* Felder & Felder, 1859
(Pl. 6, fig. 1)
Range (R).— Sulawesi Region.
Foodplants.— As genus. Igarashi & Fukuda (2000) illustrate the early stages.

— **P. tritaea tritaea* Felder & Felder, 1859
Range.— Sulawesi (N, C), Bangka.

— **P. tritaea bargylia* Fruhstorfer, 1910
Range.— Sulawesi (S, SE).

— **P. tritaea bilinearis* Fruhstorfer, 1910
Range.— Salayar.

— **P. tritaea octaviae* Snellen, 1894
Range.— Tanahjampea, Kalao.

— **P. tritaea binongkoensis* Hanafusa, 1998
Range.— Binongko.
— **P. tritaea illustris* Hanafusa, 1991
Range.— Kep. Tukangbesi (Wangiwangi).
— **P. tritaea* subsp.
Range.— Batuata (Hanafusa, 1998)
— **P. tritaea sarasinorum* Martin, 1913
Range.— Kabaena, Muna, Buton.
— **P. tritaea hermocinia* Fruhstorfer, 1910
Range.— Kep. Banggai (Peleng).
— **P. tritaea sulaensis* Joicey & Talbot, 1926
Range.— Kep. Sula.

Ixias Hübner, 1819

(Indian, or small orange tips — Pl. 6, fig. 4)

Range (1+2+5+6+7).— Oriental Region eastwards to Lesser Sunda Islands, Philippines and Sulawesi. A medium-sized genus of about 16 species, considered by Klots (1933) to be very closely related to the primarily Afrotropical *Colotis*. Represented in Sulawesi, at the eastern limit of the distribution of the group, by two allopatric endemics.

Foodplants.— Capparaceae (*Capparis, Crateva*).

Key works.— Gabriel (1943), Holloway (1973), Yata (1981a).

**I. piepersi* Snellen, 1878

Range (E).— Sulawesi (S).

**I. paluensis* Martin, 1914
(Pl. 6, fig. 4)

Range (E).— Sulawesi (C).

Leptosia Hübner, 1818

(spirits — Pl. 6, fig. 9)

Range (1+2+5+6+7).— Afrotropical and Oriental Regions, eastwards to Lesser Sunda Islands, Philippines and Sulawesi; about half a dozen species. According to Klots (1933) this genus of exceptionally fragile butterflies is very isolated, with no obvious close relatives. As such, it is notable that it occurs in the Lesser Sunda Islands and western Wallacea, but has not been found in Kep. Banggai, Kep. Sula, Maluku or further east. Corbet & Pendlebury (1992) speculate that the wide distribution of *nina*, the principal Oriental species (which might only be a subspecies of the African *L. alcesta*), could have been influenced by man's cultivation of the larval foodplants. The presence of two supposedly distinct species on Sulawesi appears to conflict with this idea but, as the two Sulawesi Region species are allopatric, the separate status of the endemic must itself be open to doubt.

Foodplants.— Capparaceae, ?Rhamnaceae.

Key works.— Corbet & Pendlebury (1992), Yata (1981a).

L. nina Fabricius, 1793
(Psyche)

Range (1+2+5+6+7).— Sri Lanka, India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Capparis, Cleome, Crateva, Polanisia* (Capparaceae); ?*Rhamnus* (Rhamnaceae). Foodplants and early stages illustrated by Igarashi & Fukuda (1997, 2000).

— **L. nina dione* Wallace, 1867

Range.— Sulawesi (S, SE), Buton, Kabaena, Muna (Galla).

— **L. nina aebutia* Fruhstorfer, 1910

Range.— Tanahjampea, Kalao.

— **L. nina* subsp. (Jurriaanse & Lindemans, 1920)

Range.— Kep. Tukangbesi (Binongko, Tolandono).

**L. lignea* Vollenhoven, 1865
(Pl. 6, fig. 9)

Range (E).— Sulawesi (N, C).

Foodplants.— *Capparis* (Capparidaceae) (Igarashi & Fukuda, 2000, who illustrate the early stages as well as the foodplants).

***Elodina* Felder & Felder, 1865**
(pearl whites — Pl. 6, fig. 8)

Range (4+5+6).— Eastern Java, Lesser Sunda Islands, Sulawesi Region, central Maluku, New Guinea region, Solomon Islands, New Caledonia, Australia. A genus of about 16-24 very poorly understood and rather fragile species, mainly occurring in Australia and the Papuan subregion, with three or four representatives in Sulawesi (where they appear to be submontane in habitat). According to Klots (1933), *Elodina* is "distinct ... with no near relatives." Probably the genus is an eastern (Papuan) element in the Sulawesi butterfly fauna, as it occurs in E Java and the Lesser Sunda Islands, but in the absence of a phylogenetic analysis such an opinion is rather speculative and only based on the centre of the diversity of the genus.

It seems likely that a still undescribed species occurs in N Sulawesi. Moreover, the conspecificity of *boisduvali* and *egnatia* is disputable.

Foodplants.— Capparaceae (*Capparis*).

Key works.— Common & Waterhouse (1981), Yata (1981a), Parsons (1999).

E. egnatia Godart, 1819

Range (4+5).— Northern Sulawesi, central Maluku (Ambon, Seram), and Lesser Sunda Islands (Sumba, Timor and Tanimbar).

Foodplants.— *Capparis* (Capparaceae).

— **E. egnatia boisduvali* Fruhstorfer, 1911

Range.— Sulawesi (N).

**E. sota* Eliot, 1956
(Pl. 6, fig. 8)

Range (E).— Sulawesi (S).

**E. dispar* Röber, 1887

Range (L).— Kep. Banggai (Banggai, Peleng).

Delias Hübner, 1819

(jezebels — Pl. 6, fig. 10)

Range (W).— Oriental, south-eastern Palaearctic and Australian Regions, from Sri Lanka to Solomon Islands, Australia and New Caledonia. This very large genus, with about 220 species (Yagishita *et al*., 1993), is widely distributed throughout the Indo-Australian area but most richly represented in the Papuan Region. Yagishita *et al.* (1993) have revised Talbot's (1928-1937) division of *Delias* into 20 species groups, to recognise a total of 22 groups; 7 of these occur in the Sulawesi Region, represented by 10 species (all but one of which are endemic). Of these, five represent three widespread groupings, but the other five belong to exclusively western groups. Thus, although the richest potential source-area for *Delias* on Sulawesi would appear to lie to the east (in the Papuan Region), the limited taxonomic information available is consistent with an Asian or Sundanian origin for the local fauna.

Foodplants.— Anacardiaceae (*Mangifera*), Buddlejaceae (*Buddleja*), Dioscoreaceae (*Dioscorea*), Fabaceae (*Butea, Senna*), Loranthaceae (*Amyema, Amylotheca, Decaisnina, Dendrophthoe, Diplatia, Helicanthes, Helixanthera, Korthalsella, Loranthus, Macrosolon, Muellerina, Notothixos, Oryctanthus, Scurrula, Taxillus*), Malvaceae (*Abelmoschus*), Myrtaceae (*Psidium*), Oxalidaceae (*Averrhoa*), Rubiaceae (*Coffea, Nauclea*), Rutaceae (*Citrus*), Santalaceae (*Dendrotrophe, Exocarpos, Santalum*), Sterculiaceae (*Brachychiton, Pterospermum, Theobroma*), Theaceae (*Camellia*), Viscaceae (*Viscum*).

Key works.— Talbot (1928-1937), Yata (1981a), Okano (1989), Yagishita *et al*. (1993).

D. kuehni Honrath, 1886

(Kuehn's Jezebel)

Range (4).— Sulawesi Region and C Maluku (Buru - see Yagishita *et al*., 1993; Peggie *et al*., 1995). A member of the *singhapura*-group, which includes species occurring from Burma, Thailand, Malay Peninsula, Sumatra, Borneo and Philippines, to the Sulawesi Region and Buru.

— **D. kuehni prinsi* Martin, 1912

Range.— Sulawesi (C, S).

— **D. kuehni kuehni* Honrath, 1886

Range.— Kep. Banggai.

— **D. kuehni sulana* Staudinger, 1894

Range.— Kep. Sula.

**D. battana* Fruhstorfer, 1896

Range (E).— Sulawesi (C, S). This and the next species, which appear to be closely related, were included by Talbot (1928-1937) in the widespread *nysa*-group, with *battana* as a subspecies of *georgina* (a species otherwise distributed through Sundaland, including the Philippines). Yagishita *et al*. (1993) subdivide the *nysa*-group into two, to include the Sulawesi species in the *georgina*-group, which is entirely western in distribution.

— **D. battana battana* Fruhstorfer, 1896
Range.— Sulawesi (S).
— **D. battana ariae* Nakano, 1993
Range.— Sulawesi (C).

**D. shirozui* Yata, 1981
(Shirôzu's Jezebel)

Range (E).— Sulawesi (C). Yata (1981b) noted that this species flies at 500-800 m, whereas in C Sulawesi *D. battana* is found at 1600-2000 m. *Delias kikuoi* Okano, 1989, described from central Sulawesi, is included by Yagishita *et al*. (1993) as a synonym.

**D. surprisa* Martin, 1913

Range (E).— Sulawesi (C). This species (treated by Talbot as a subspecies of *D. belladonna*) is an isolated member of the *belladonna*-group, otherwise restricted to the Asian mainland except for *belladonna* itself, which extends from China to the Malay Peninsula and Sumatra.

**D. benasu* Martin, 1912
(Pl. 6, fig. 10)

Range (E).— Sulawesi (C). Included by Talbot in the *belladonna*-group, but placed by Yagishita *et al*., 1993, in the (entirely western) *pasithoe*-group.
— **D. benasu benasu* Martin, 1912
Range.— Sulawesi (C).
— **D. benasu* subsp. nov. Yamauchi *et al*. (in press).
Range.— Sulawesi (C: Mt Tambusisi).

**D. zebuda* Hewitson, 1862

Range (R).— Sulawesi (N, C, S), Salayar, Muna, Kabaena, Kep. Banggai (Peleng) (Yagishita *et al*., 1993). Belongs to the widespread *belisama* group.

**D. melusina* Staudinger, 1891

Range (E).— Sulawesi (N, C). A member of the widespread *dorimene*-group, Talbot (1928-1937) considered it to be closely related to *D. agostina*, which belongs to the group confined to the Asian mainland (including the Malay Peninsula). The northern and central populations appear to be distinct races, but Yagishita *et al*. (1993) do not differentiate them. The following species is closely related.

**D. kazueae* Kitahara, 1986

Range (L).— Kep. Sula (Taliabu).

**D. rosenbergi* Vollenhoven, 1865
(Rosenberg's Painted Jezebel)

Range (R).— Sulawesi Region. This species and the next (which should perhaps best be treated as a single polytypic species) belong to the widespread *hyparete*-group. Both are considered by Talbot (1928-1937) as vicariants of *hyparete* itself, an Indo-Malayan species distributed from China to the Greater Sunda Islands and the Philippines.

Foodplants.— *Loranthus* sp. (Loranthaceae).

— **D. rosenbergi rosenbergi* Vollenhoven, 1865

Range.— Sulawesi (N, C, SE), Kep. Banggai (Peleng; Nieuwenhuis, 1946).

— **D. rosenbergi chrysoleuca* Mitis, 1893

Range.— Sulawesi (S).

— **D. rosenbergi saleyerana* Rothschild, 1915

Range.— Salayar.

— **D. rosenbergi munaensis* Nakano, 1988

Range.— Muna, Buton (Yagishita *et al*., 1993).

**D. mitisi* Staudinger, 1894

Range (L).— Kep. Banggai, Kep. Sula.

— **D. mitisi banggaiensis* Talbot, 1928

Range.— Kep. Banggai.

— **D. mitisi mitisi* Staudinger, 1894

Range.— Kep. Sula (Mangole, Sanana, Taliabu: Allyn Museum - see also Yagishita *et al*., 1993).

Appias Hübner, 1819

(albatrosses and puffins — Pl. 6, fig. 13)

Range (W).— Afrotropical, Oriental and Australian Regions. A genus of nearly 40 species divided by Klots (1933) into four subgenera, three of which are represented on Sulawesi, and by Yata (1981a) into seven groups, including five subgenera, four of which are found on Sulawesi.

Foodplants.— Mainly Capparaceae, Euphorbiaceae.

Key works.— Klots (1933), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Yata (1981a).

Appias (Appias) Hübner, 1819

Range.— Oriental Region. Yata (1981a) recognised that *lyncida, ithome, nephele, hombroni* and *ada* collectively form a distinct group, the *lyncida*-group, but gave no subgeneric name. Here we propose to include them, tentatively, within the nominotypical subgenus. Subgenus *Appias* includes seven species, three of which occur on Sulawesi.

A. (A.) lyncida Cramer, 1777

(Chocolate Albatross)

Range (1+2+5+6+7).— Sri Lanka, southern India, northeastern India, Indo-China, southern China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Capparis, Crateva*, ?*Gynotroches* (oviposition record in Morrell, 1960) (Capparaceae). Igarashi & Fukuda (1997) illustrate the early stages.

— **A. (A.) lyncida gellia* Fruhstorfer, 1910

Range.— Sulawesi (N, C).

— **A. (A.) lyncida lycaste* Felder & Felder, 1865
Range.— Sulawesi (S).
— **A. (A.) lyncida* subsp. (BMNH)
Range.— Kep. Talaud.
— **A. (A.) lyncida* subsp. (ZSBS, de Jong *in litt.*)
Range.— Salayar, Buton.
— **A. (A.) lyncida lutatia* Fruhstorfer, 1910
Range.— Kalao, Tanahjampea.
— **A. (A.) lyncida* subsp. (Jurriaanse & Lindemans, 1920)
Range.— Kabaena.
— *A. (A.) lyncida floresiana* Butler, 1898
Range.— Lesser Sunda Islands (Flores, Alor, ?Sumba), Kep. Tukangbesi (Kaledupa).

**A. (A.) ithome* Felder & Felder, 1859
Range (R).— Sulawesi (N, C, S), Salayar.
Foodplants.— *Capparis* (Capparaceae) (Igarashi & Fukuda, 2000, who illustrate the foodplant and the early stages).

A. (A.) hombroni Lucas, 1852
Range (3).— Sulawesi Region, N Maluku (Peggie *et al*., 1995).
— **A. (A.) hombroni hombroni* Lucas, 1852
Range.— Sulawesi, Kep. Sangihe (Sangihe, Siao).
— **A. (A.) hombroni tombugensis* Fruhstorfer, 1902
Range.— Sulawesi (C, SE), Kep. Banggai (Peleng).
— **A. (A.) hombroni sulanorum* Fruhstorfer, 1902
Range.— Kabaena (Jurriaanse & Lindemans, 1920), Kep. Sula (Mangole, Sanana).

Appias (Phrissura) Butler, 1870

Range.— Malay Peninsula, Sumatra, Borneo, Palawan, Philippines, Sulawesi Region, ?northern Maluku. According to Corbet (1946a), the subgenus consists of a single species distributed from the Malay Peninsula to Sulawesi. Yata (1981a), however, recognises two allopatric species, the Sulawesi Region populations being conspecific with the Philippine taxon.

A. (P.) aegis Felder & Felder, 1861
(Eastern Forest White)
Range (1+2).— Philippines (including Palawan), Sulawesi Region, ?northern Maluku (not confirmed by Peggie *et al.*, 1995).
Foodplants.— *Capparis* (Capparaceae - see Nuyda & Kitamura, 1993a).
— **A. (P.) aegis polisma* Hewitson, 1861
Range.— Sulawesi (N).
— **A. (P.) aegis aegina* Fruhstorfer, 1899
Range.— Sulawesi (C, S).
— **A. (P.) aegis gerasa* Fruhstorfer, 1910
Range.— Kep. Sula (Mangole).

Appias (Hiposcritia) Geyer, 1832

Range.— Oriental Region. About 13 species, one of which occurs in Sulawesi.

**A (H.) urania* Wallace, 1867 (= *zondervani* Toxopeus, 1950)

Range (E).— Sulawesi (N, C, S).

Note.— Formal synonymy of these names will be established by Yata *et al*. (in prep.).

Appias (Catophaga) Hübner, 1819

Range.— Oriental and Australian Regions. Fifteen species, five of which occur in the Sulawesi Region.

Key works.— Yata *et al*. (in prep.).

A. (C.) nero Fabricius, 1793
(Orange Albatross)

Range (P).— Burma, Malay Peninsula, Greater Sundas, Bali, Lombok, Palawan, Philippines, Tanahjampea.

Foodplants.— *Capparis* (Capparaceae); *Drypetes, Pithecolobium* (Euphorbiaceae: Dupont & Scheepmaker, 1936)

— *A. (C.) nero* subsp. (cf. *zamobanga* C & R Felder, 1862)

Range.— Kep Talaud (Talaud, Salebabu; BMNH).

— **A. (C.) nero acuminata* Snellen, 1890

Range.— Tanahjampea.

A (C.) zarinda Boisduval, 1836
(Eastern Orange Albatross)

Range (4).— Sulawesi Region, C Maluku (Buru). Formally separated from *A. nero* Fabricius by Yata (1981a; see also Peggie *et al*., 1995).

— **A (C.) zarinda zarinda* Boisduval, 1836

Range.— Sulawesi, Kabaena, Kep. Tukangbesi, Kep. Banggai (Peleng).

— **A (C.) zarinda phestus* Westwood, 1888

Range.— Kep. Sangihe, Kep. Talisei.

— **A (C.) zarinda sulana* Fruhstorfer, 1899

Range.— Kep. Sula (Mangole).

**A. (C.)* new species Yata & Vane-Wright, in prep.
(= *Tachyris nero zarinda* ab. *aurosa* Fruhstorfer, 1899 [unavailable name])
(Golden Albatross – Pl. 6, fig. 13)

Range (E).— Sulawesi (C, S), Buton.

Note.— This taxon has previously been treated as a male form of *A. zarinda*, but represents a distinct species, as yet only known from the male sex (Yata *et al*., in prep.).

A. (C.) albina Boisduval, 1836
(White, or Common Albatross)

Range (W).— Sri Lanka, southern India, Andamans, NE India, Indo-China, SE

China, Hainan, to Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea, and northern Australia.

Foodplants.— *Capparis*, *Crataeva* (Capparaceae); *Drypetes* (Euphorbiaceae). Igarashi & Fukuda (2000) illustrate foodplants and early stages.

— *A. (C.) albina albina* Boisduval, 1836

Range.— Borneo, Sulawesi, Tanahjampea, Kep. Banggai (Peleng; Nieuwenhuis, 1946), Kep. Sula, N & C Maluku, eastern Lesser Sunda islands, Aru, Kep. Kai, New Guinea, northern Australia.

A (C.) paulina Cramer, 1777
(Common Albatross)

Range (W).— Burma, Indo-China, SE China, Taiwan, Ryukyu Islands, Malay Peninsula, Nicobars, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, New Caledonia, Vanuatu, ?Samoa, Australia.

Foodplants.— *Capparis* (Capparaceae); *Drypetes, Putranjiva* (Euphorbiaceae). Igarashi & Fukuda (2000) illustrate the early stages.

— **A (C.) paulina albata* Hopffer, 1874 (= *urania* auctt. nec Wallace, 1867)

Range.— Sulawesi, Kep. Sula (Mangole).

Note.— The taxonomy of this subspecies will be clarified by Yata *et al.*(in prep.).

Saletara Distant, 1885
(albatrosses — Pl. 6, fig. 12)

Range (1+2+3+4+6+7).— Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands. Three or four species.

Key works.— Cowan (1955), Corbet & Pendlebury (1992), Yata (1981a).

S. panda Godart, 1819
(Pl. 6, fig. 12)

Range (1+2+6+7).— Malay Peninsula, Sumatra, Java, Bali, ?Sumbawa, Borneo, Palawan, Philippines, Sulawesi Region.

— **S. panda nigerrima* Holland, 1891

Range.— Sulawesi (N: Allyn Museum; C, S, SE: Roos, 1995).

— **S. panda watanabei* Detani, 1983

Range.— Kep. Banggai (Peleng).

— **S. panda aurantiaca* Staudinger, 1894

Range.— Kep. Sula (Mangole).

Cepora Billberg, 1820
(gulls — Pl. 6, fig. 11)

Range (W).— Oriental, Australian and Pacific Regions. A medium-sized genus of about 20 species, not less than eight of which have been recorded from the Sulawesi Region, with five from Sulawesi itself.

Foodplants.— Capparaceae (*Cadaba, Capparis, Maerua*), Stachyuraceae (*Stachyurus*).

Key works.— Corbet & Pendlebury (1992), Common & Waterhouse (1981), Yata (1981a).

**C. timnatha* Hewitson, 1862
(Pl. 6, fig. 11)

Range (R).— Sulawesi Region.

— **C. timnatha timnatha* Hewitson, 1862
Range.— Sulawesi (N, C).

— **C. timnatha filia* Fruhstorfer, 1902
Range.— Sulawesi (S).

— **C. timnatha* subsp. (Roos, 1995)
Range.— Sulawesi (SE).

— **C. timnatha aurulenta* Fruhstorfer, 1899
Range.— Kep. Banggai (Peleng).

— **C. timnatha filiola* Fruhstorfer, 1899
Range.— Kep. Sula (Sanana).

— **C. timnatha soror* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole).

**C. celebensis* Rothschild, 1892

Range (R).— Sulawesi Region.

— **C. celebensis celebensis* Rothschild, 1892
Range.— Sulawesi (N, C, S), Salayar, Kep. Banggai (Peleng).

— **C. celebensis kazuyoe* Watanabe, 1987
Range.— Buton.

**C. eurygonia* Hopffer, 1874

Range (L).— Kep. Togian.

Note.— Separate specific status for this nominal taxon must be open to doubt.

C. perimale Donovan, 1805
(Australian Gull)

Range (P).— Bawean, Kangean, Lesser Sunda Islands, Salayar, Kep. Tukangbesi, Muna, C & S Maluku, New Guinea region, Solomon Islands, New Caledonia, Vanuatu, Norfolk Island, Fiji, Australia.

Foodplants.— *Capparis* (Capparaceae).

— **C. perimale* subsp. (Jurriaanse & Lindemans, 1920)
Range.— Muna (Galla).

— **C. perimale toekangbesiensis* Jurriaanse & Lindemans, 1920
Range.— Kep. Tukangbesi (Binongko, Tomea).

— **C. perimale kuehni* Röber, 1885
Range.— Salayar.

C. iudith Fabricius, 1787
(Orange Gull)

Range (5+6+7).— Burma, Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Sulawesi.

Foodplants.— *Capparis* (Capparaceae).

— **C. iudith* subsp. (ZSBS; de Jong *in litt*., Hausmann *in litt*.)

Range.— Sulawesi (N).

C. aspasia Stoll, 1790

Range (P).— Philippines (including Palawan), Kep. Talaud, N & C Maluku, New Guinea.

Foodplants.— *Capparis* (Capparaceae) (Igarashi & Fukuda, 1997).

— **C. aspasia talautensis* Niepelt, 1926

Range.— Kep. Talaud.

**C. eperia* Boisduval, 1836

Range (R).— Sulawesi, Kep. Banggai (Peleng; Nieuwenhuis, 1946).

**C. fora* Fruhstorfer, 1897

Range (R).— Sulawesi, Buton.

— **C. fora papayatana* Watanabe, 1987

Range.— Sulawesi (N).

— **C. fora fora* Fruhstorfer, 1897

Range.— Sulawesi (C, S).

— **C. fora milos* Watanabe, 1987

Range.— Buton.

***_Aoa_ de Nicéville, 1898**
(Pl. 6, fig. 3)

Range (E).— Sulawesi (monobasic). According to Klots (1933), the relationships of this distinctive butterfly are uncertain.

Key works.— Yata (1981a).

**A. affinis* Vollenhoven, 1865
(Pl. 6, fig. 3)

Range (E).— As genus.

***Belenois* Hübner, 1819**
(pioneers — Pl. 6, fig. 7)

Range (4+5+6).— A genus of about 30 species mainly occurring in the Afrotropical Region and the Indian subcontinent, discontinuously distributed in the Indo-Australian region (absent from the Malay Peninsula); the only representative in the Malay Archipelago and the Australian and Pacific Regions is the highly migratory *B. java*.

Foodplants.— Capparaceae.

Key works.— Yata (1981a).

B. java Sparrman, 1767
(Caper White — Pl. 6, fig. 7)

Range (4+5+6).— Java, Lesser Sunda Islands, Sulawesi, central Maluku (Ambon), Bismarck Islands to New Caledonia, Fiji, Samoa, Tonga, Australia.

Foodplant.— *Apophyllum, Capparis* (Capparaceae). Igarashi & Fukuda (1997) illustrate all life stages.

— *B. java java* Sparrman, 1767

Range.— Java, Lesser Sunda Islands, Sulawesi (N, C, S), Salayar, Tanahjampea, Maluku (Ambon).

Lycaenidae [Leach], [1815]
(blues, coppers, hairstreaks)

Range.— Cosmopolitan; about 4000 species; following the standard list of GloBIS (Lamas *et al*., in prep.) and contrary to Ackery *et al*. (1999) and a number of earlier authors [e.g., Eliot (1973, 1990) and Kristensen (1976)], the Riodininae are given family rank. In the GloBIS list, Eliot's (1990) proposal to include the Lipteninae within the Poritiinae, and the Liphyrinae within the Miletinae has been followed, leaving the Lycaenidae with six subfamilies, five of which are represented in the Sulawesi Region.

Food.— A great variety of trophic relationships affect lycaenid butterflies (Fiedler, 1996a); about 150 families of plants recorded as hosts (Fiedler, 1995); one major (African) group feeds on minute algae associated with lichens (Henning, 1983; Bampton, 1995); many lycaenids are associated with ants (Pierce *et al*., 2002), and some are aphytophagous, feeding on the early stages of ants, or various Homoptera tended by them (Cottrell, 1984; Fiedler, 1991).

Key works.— Ehrlich (1958), Eliot (1973, 1990), Kristensen (1976), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Cottrell (1984), Maschwitz *et al.* (1984, 1985a, 1985b, 1988), d'Abrera (1986), Bridges (1988b), Shields (1989a), Ackery (1989), Fiedler (1991, 1995), de Jong *et al.* (1996), Ackery *et al.* (1999), Pierce *et al*. (2002).

Miletinae Reuter, 1896
(moth butterflies, harvesters, brownies, darkies — Pl. 7, figs 2-5)

Range.— Palaeotropics and Holarctic Region; a small subfamily of about 150 species, divided into five tribes and 18 genera; three tribes and five genera are found on Sulawesi.

Food.— Wholly aphytophagous, feeding mainly on Homoptera, sometimes on ant brood, and often attended by ants.

Key works.— Eliot (1973), Corbet & Pendlebury (1992), Cottrell (1984), R.L. Kitching (1987), Maschwitz *et al.* (1985a, 1985b, 1988).

Liphyrini Doherty, 1889
(moth butterflies — not illustrated)

Range.— A rather small group of about 20 species included in five genera, four of

which are Afrotropical, and represented in the Indo-Australian region by *Liphyra*.

Food.— Aphytophagous, feeding wholly on ant brood, ant regurgitations, or Homoptera (Cottrell, 1984; Fiedler, 1991).

Key works.— d'Abrera (1977, 1980, 1986).

Liphyra Westwood, 1864

(moth butterflies — not illustrated)

Range (3+6+7).— Northern India to Thailand, Malay Peninsula, Sumatra, Belitung, Java, Borneo, Philippines (Luzon, Homonhon: Treadaway, 1995), Sulawesi, N Maluku, Kep. Kai, New Guinea, Solomons (Samson & Smart, 1980) and Australia. Two species.

Food.— As subfamily. See also Cottrell (1987) and Fiedler (1991).

Key works.— d'Abrera (1977, 1986), Samson & Smart (1980), Parsons (1999).

L. brassolis Westwood, 1864

(moth butterfly — not illustrated)

Range (3+6+7).— As genus.

— *L. brassolis robusta* Felder & Felder, 1865

Range.— Sulawesi (N), N Maluku (Halmahera), New Guinea, Manam, Solomon Islands (Tennent, 2002).

Westwood's (1888) record of *L. brassolis* from N Sulawesi stood unconfirmed for over a century. Samson & Smart (1980) were unable to locate his material, and were thus uncertain about identity of the Sulawesi population with *b. robusta* (type-locality: Halmahera). Ishii (1997) illustrates a single, rather dark male collected near Kotamobagu (Sulawesi Utara), in March 1994, but declined to place it to subspecies; it appears similar to but not identical with *L. b. robusta* Felder from Maluku.

Food.— Brood of *Oecophylla* ants (Johnson & Valentine, 1986; Cottrell, 1987; Igarashi & Fukuda, 2000).

Miletini Reuter, 1896

(brownies, darkies — Pl. 7, figs 2-4)

Range.— Palaeotropics; about 80 species in five genera, three of which are found in the Sulawesi Region.

Food.— Homoptera (aphids, coccids, membracids) and, more rarely, ant brood; often attended by ants (e.g. *Dolichoderus*, *Crematogaster*, *Anoplolepis*).

Key works.— Eliot (1986b).

Allotinus Felder & Felder, 1865

(darkies — Pl. 7, fig. 2)

Range (1+2+5+6+7).— Northern India to Java, Lesser Sunda Islands, Philippines and Sulawesi. Three subgenera, two of which occur in Sulawesi. The subgenus not represented consists of 10 species, distributed from Burma to Sundaland and the Philippines.

Food.— Aphids, membracids; often ant-attended.

Key works.— Corbet & Pendlebury (1992), Eliot (1986b).

Allotinus (Allotinus) Felder & Felder, 1865

Range.— Burma, Malay Peninsula, Sumatra, Java, Borneo, Philippines and Sulawesi. A group of seven species divided into two species groups, both represented in the Sulawesi Region.

Food.— Species of this subgenus are recorded to feed on membracids, and be attended by ants (e.g. *Anoplolepis*) (R.L. Kitching, 1987; Maschwitz *et al.*, 1988).

A. (A.) fallax Felder & Felder, 1865

Range (P).— West Malaysia, Sumatra, northern Borneo, Philippines (excluding Palawan), Kep. Talaud. The only member of the *fallax*-group to occur in the Sulawesi Region.

— *A. (A.) fallax aphacus* Fruhstorfer, 1913

Range.— Southern Philippines, Kep. Talaud (one female: Cassidy, 1995a).

**A. (A.) major* Felder & Felder, 1865

Range (R).— Sulawesi, Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula (Mangole). This and the next species comprise the *major*-group, which is thus restricted to the Sulawesi Region.

Food.— *Terentius* (Membracidae); attended by *Anoplolepis* (Formicidae) (R.L. Kitching, 1987). Igarashi & Fukuda (2000) illustrate larva and pupa.

**A. (A.) maximus* Staudinger, 1888

Range (E).— Sulawesi (N, C, S: Cassidy, 1995a).

Allotinus (Paragerydus) Distant, 1884

(Pl. 7, fig. 2)

Range.— Northern India, Burma, Malay Peninsula, Sumatra, Java, Borneo, Lesser Sunda Islands, Philippines and Sulawesi Region. Of the 16 species included, four occur on Sulawesi.

Food.— A species of this subgenus has been recorded to feed on *Pseudoregma* (Hormaphididae), attended by *Crematogaster*; in another case, the first instar larvae probably fed on coccids, and thereafter on brood of a myrmicine ant, *Myrmicaria* (Maschwitz *et al.*, 1988), or in association with *Anoplolepis* (Fiedler, 1996b).

A. (P.) samarensis Eliot, 1986

Range (2).— Philippines (Samar, Leyte, Mindanao: Treadaway, 1995), Sulawesi.

— **A. (P.) samarensis russelli* Eliot, 1986

Range.— Sulawesi (C).

**A. (P.) macassarensis* Holland, 1891

Range (R).— Sulawesi Region.

— **A. (P.) macassarensis macassarensis* Holland, 1891

Range.— Sulawesi (C, S), Kep. Banggai.

— **A. (P.) macassarensis menadensis* Eliot, 1967

Range.— Sulawesi (N), Bangka.

A. (P.) albatus Felder & Felder, 1865
(Pl. 7, fig. 2)

Range (2).— Philippines (Luzon, Marinduque, Samar: Treadaway, 1995), Sulawesi.

— **A. (P.) albatus albatus* Felder & Felder, 1865

Range.— Sulawesi (N: Cassidy, 1995a).

A. (P.) unicolor Felder & Felder, 1865
(Lesser Darkie)

Range (2+5+6+7).— Assam, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Bohol, Mindoro, Sanga Sanga, Tawitawi: Treadaway, 1995), Sulawesi Region.

Food.— Oviposition recorded on 5 aphid species, 1 psyllid and 2 membracids; associated with ants (*Anoplolepis*, Formicinae) (Fiedler & Maschwitz, 1989).

— **A. (P.) unicolor zitema* Fruhstorfer, 1916

Range.— Sulawesi, Kep. Banggai, Kep. Sula (Mangole).

Logania Distant, 1884
(mottles — Pl. 7, fig. 3)

Range (W).— Oriental Region eastwards to New Guinea and Bismarcks, including Lesser Sunda Islands. Eleven species, three of which are Sulawesi Region endemics.

Food.— Homoptera (e.g. *Pseudoregma*, coccids, membracids, aphids) and, in some cases, their secretions (or possibly even ant larvae: Parsons, 1999); attended by ants (e.g. myrmicines *Leptothorax, Rhoptromyrmex*, *Technomyrmex* and the dolichoderine *Hypoclinea*), apparently in some cases (at least) in permanent specific associations involving the pupae as well as larvae (Maschwitz *et al.*, 1988; Fiedler, 1993; Parsons, 1999).

Key works.— Corbet & Pendlebury (1992), Eliot (1986b).

**L. paluana* Eliot, 1986

Range (E).— Sulawesi (C).

**L. obscura* Röber, 1886
(Pl. 7, fig. 3)

Range (R).— Sulawesi (?N, S), Buton, Kep. Tukangbesi, Kep. Banggai.

**L. dumoga* Cassidy, 1995

Range (E).— Sulawesi (N).

The species bears a superficial resemblance to *L. marmorata palawana*. The record of the latter species from Sulawesi by Seki *et al.* (1991) is probably based on confusion with the present taxon.

Miletus Hübner, 1819
(brownies — Pl. 7, fig. 4)

Range (W).— Oriental Region, Wallacea and New Guinea (Eliot, 1986b; no *Miletus* from New Guinea noted by Parsons, 1999). The genus includes about 25 species divi-

ded into five species-groups; the four species found on Sulawesi represent two of these groups.

Food.— Aphids and coccids; often ant-attended (e.g., Maschwitz *et al.*, 1985a, 1988, record a Malayan *Miletus* on coccids and on hormaphids, including *Pseudoregma*, in all cases attended by *Dolichoderus*; Fiedler, 1996b, notes association with *Hypoclinea*).

Key works.— Eliot (1961, 1986b), Corbet & Pendlebury (1992).

M. boisduvali Moore, 1858
(Boisduval's Brownie)

Range (3+4+5+6+7).— Sumatra, Java, Lesser Sunda Islands, Borneo, Sulawesi Region, N & C Maluku, New Guinea. This is the Sulawesi representative of the *boisduvali*-group, which includes three other species.

Food.— *Ceratophis* (Aphididae), *Pseudococcus* (Coccidae); attended by *Dolichoderus* (Formicidae).

— **M. boisduvali diotrophes* Fruhstorfer, 1913

Range.— Sulawesi (E).

— *M. boisduvali boisduvali* Moore, 1858

Range.— As species, including Kep. Sula (Mangole, Sanana), but excluding Sulawesi, Timor and Kai Islands.

**M. celinus* Eliot, 1961

Range (E).— Sulawesi (S). This and the remaining two Sulawesi *Miletus* belong to the *symethus*-group, which includes a total of about eight species.

**M. rosei* Cassidy, 1995

Range (E).— Sulawesi (N).

M. leos Guérin-Méneville, 1830
(Pl. 7, fig. 4)

Range (3+4+5).— Lesser Sunda Islands, Sulawesi Region, N & C Maluku, New Guinea.

— **M. leos maximus* Holland, 1890

Range.— Sulawesi (N, C, S, SE), Kep. Sangihe, Kep. Talaud, Buton, Muna, Kep. Banggai (Peleng) (see Cassidy, 1995a).

— **M. leos catoleucos* Fruhstorfer, 1913

Range.— Salayar, Kep. Tukangbesi.

— **M. leos tellus* Fruhstorfer, 1913

Range.— "Java" (doubtful), "Wetar" (doubtful), ?Sumbawa (Eliot, 1961), Tanahjampea.

— **M. leos* subsp. (Eliot, 1961)

Range.— Kep. Tukangbesi.

— **M. leos mangolicus* Fruhstorfer, 1913

Range.— Kep. Sula (Mangole, Sanana).

Spalgini Toxopeus, 1929
(apeflies, or harvesters — Pl. 7, fig. 5)

Range.— As subfamily; two genera, one being the monotypic Nearctic genus *Feniseca*.

Note.— Some authors have suggested that the Spalgini are more closely related to the Polyommatinae than to the true Miletinae.

Food.— Homoptera (Coccidae, Pemphigidae, Pseudococcidae); not associated with ants.

Key works.— Eliot (1973), Corbet & Pendlebury (1992), Cottrell (1984).

***Spalgis* Moore, 1879**
(apeflies — Pl. 7, fig. 5)

Range (W).— Palaeotropics. A small genus of about 10 species (only 5 according to Parsons, 1999), only one of which occurs on Sulawesi.

Food.— Coccids and pseudococcids, often camouflaging themselves with the debris of their prey (Parsons, 1999).

Key works.— Corbet & Pendlebury (1992), Cottrell (1984), Parsons (1986).

S. epius Westwood, 1851
(Apefly — Pl. 7, fig. 5)

Range (W).— Sri Lanka, India, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines (Treadaway, 1995), Sulawesi Region, N & C Maluku, Kep. Kai.

Food.— *Dactylopius* (Coccidae). Igarashi & Fukuda (2000) illustrate the early stages.

— **S. epius substrigatus* Snellen, 1878

Range.— Sulawesi.

— **S. epius* subsp. (BMNH)

Range.— Kep. Sula.

Poritiinae Doherty, 1886
(gems and bluejohns; zulus, Acraea mimics — Pl. 7, fig. 1)

Range.— Afrotropical and Oriental Regions; about 600 species divided amongst three tribes, Pentilini, Liptenini and Poritiini. The former two are Afrotropical and contain, with about 122 and 400 species, respectively, by far the larger part of the subfamily.

Foodplants.— Lichens and microscopic algae; Fagaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992), d'Abrera (1986).

Poritiini Doherty, 1886

Range.— Oriental Region, including Philippines and Sulawesi; a small tribe of about 65, mostly rare species included within five genera; two of these genera are now known to be represented on Sulawesi. According to Osada (1994), more Poritiinae from Sulawesi await description.

Foodplants.— Fagaceae.
Key works.— Eliot (1973), Corbet & Pendlebury (1992), d'Abrera (1986).

Poritia Moore, 1866
(gems — not illustrated)

Range (1+2+6+7).— North-eastern India, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi.
Foodplants.— Fagaceae (*Castanea*; *P. sumatrae* in Sabah also on *Lithocarpus*, pers. obs. by K. Fiedler). Larvae gregarious (processionary), not attended by ants.
Over 20 species, with two recently described representatives from Sulawesi.
Key works.— Eliot (1957), Corbet & Pendlebury (1992), Osada (1987, 1994).

**P. palos* Osada, 1987
Range (E).— Sulawesi (C - Palu district).

**P. personata* Osada, 1994
Range (E).— Sulawesi (C - Palu district).

Deramas Distant, 1886
(gems and bluejohns — Pl. 7, fig. 1)

Range (2+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Philippines (excluding Palawan), Sulawesi. About 30 species, of which four endemics occur in Central Sulawesi.
Key works.— Eliot (1964b, 1970), D'Abrera (1986), Osada (1987, 1994), Corbet & Pendlebury (1992).

**D. nigrescens* Eliot, 1964
(Pl. 7, fig. 1)
Range (E).— Sulawesi. Osada (1994) records this species from Palolo, near Palu.

**D. suwartinae* Osada, 1987
Range (E).— Sulawesi (C).

**D. nanae* Osada, 1994
Range (E).— Sulawesi (C).

**D. masae* Kawai (in Osada), 1994
Range (E).— Sulawesi (C).

Curetinae Distant, 1884
(sunbeams — Pl. 7, fig. 6)

Range.— Oriental Region, including Lesser Sunda Islands, just extending into Palaearctic and Papuan Regions; 18 species in 3 species groups in a single genus.

Foodplants.— Fabaceae (*Abrus*, *Adenanthera, Millettia, Pongamia*), Meliaceae; sometimes associated with ants (e.g. *Anoplolepis*, Formicinae: DeVries, 1984; but perhaps not normally: Fiedler *et al.*, 1995, Fiedler, 1996b).

Key works.— Shirôzu & Yamamoto (1957), Eliot (1973, 1990), DeVries *et al.* (1986), Fiedler *et al.* (1995).

Curetis Hübner, 1819
(sunbeams — Pl. 7, fig. 6)

Range (W).— As subfamily. Two species occur on Sulawesi, both belonging to the *thetis*-group.

Foodplants.— As subfamily.

Key works.— Evans (1954), d'Abrera (1986), Eliot (1990), Corbet & Pendlebury (1992).

**C. venata* Fruhstorfer, 1908

Range (R).— Sulawesi Region.

— **C. venata venata* Fruhstorfer, 1908
Range.— Sulawesi.

— **C. venata saleyerensis* Chapman, 1915
Range.— Salayar.

C. tagalica Felder & Felder, 1862
(Pl. 7, fig. 6)

Range (1+2+6+7).— South Vietnam, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplant.— *Millettia atropurpurea* (Fabaceae) (unpubl. record by Peter Seufert from Ulu Gombak, West Malaysia). Larvae not attended by ants.

— **C. tagalica celebensis* Felder & Felder, 1865
Range.— Sulawesi.

— **C. tagalica talautensis* Chapman, 1915
Range.— Kep. Talaud.

— **C. tagalica brunnescens* Ribbe, 1926 (= *thetis nakamotoi* Detani, 1983)
Range.— Kep. Banggai (Peleng), Kep. Sula (Mangole).

Theclinae Swainson, 1830
(hairstreaks — Pl. 7, figs 7-25)

Range.— Cosmopolitan; one of the largest subfamilies within the Rhopalocera, with well over 2000 species in 19 tribes and numerous genera. It is very well represented in South East Asia; 12 of the tribes occur on Sulawesi.

Foodplants.— A very wide range of plant families, including: Araliaceae, Arecaceae, Asteraceae, Barringtoniaceae, Casuarinaceae, Celastraceae, Combretaceae, Convolvulaceae, Dioscoreaceae, Ebenaceae, Ehretaceae, Elaeagnaceae, Elaeocarpaceae, Epacridaceae, Euphorbiaceae, Fabaceae, Fagaceae, Flagellariaceae, Hippocastanaceae, Lauraceae, Lecythidaceae, Loranthaceae, Lythraceae, Malpighiaceae, Malvaceae,

Melastomataceae, Moraceae, Myrsinaceae, Myrtaceae, Olacaceae, Orchidaceae, Oxalidaceae, Pittosporaceae, Polypodiaceae, Proteaceae, Punicaceae, Rhamnaceae, Rhizophoraceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Saxifragaceae, Smilacaceae, Sterculiaceae, Theaceae, Urticaceae, Verbenaceae. Some Theclinae are associated with ants, including some that feed on ant brood (Fiedler, 1991).

Key works.— Eliot (1973), d'Abrera (1977, 1986), Corbet & Pendlebury (1992).

Luciini Waterhouse & Lyell, 1914
(jewels)

Range.— Australian Region, with minor representation in South East Asia; in total, about 150 species in six or seven genera. A single undescribed species is known from Sulawesi.

Foodplants.— Over 30 families of flowering plants (Fiedler, 1991); associated with ants.

Key works.— Eliot (1973), d'Abrera (1977), Common & Waterhouse (1981).

***Hypochrysops* Felder & Felder, 1860**
(jewels — not illustrated)

Range (3+4+7).— A large genus of about 60 species, confined to the Australian and Papuan Regions, including Maluku, except for a single species (*H. coelisparsus* Butler) in the Oriental Region (southern Thailand, Malay Peninsula, Kep. Riau, ?Sumatra, Mentawi Islands, Borneo, ?Sulawesi - Parsons, 1999), and an undescribed species reported from Sulawesi.

Foodplants.— Araliaceae, Asteraceae, Barringtoniaceae, Casuarinaceae, Combretaceae, Dioscoreaceae, Elaeocarpaceae, Epacridaceae, Euphorbiaceae, Fabaceae, Lecythidaceae, Loranthaceae, Malpighiaceae, Melastomataceae, Myrsinaceae, Myrtaceae, Polypodiaceae, Proteaceae, Pteridophyta, Rhamnaceae, Rhizophoraceae, Rosaceae, Rubiaceae, Santalaceae, Sapindaceae, Smilacaceae, Sterculiaceae, Theaceae, Verbenaceae; attended by ants (*Crematogaster, Iridomyrmex, Pheidole*).

Key works.— Common & Waterhouse (1981), Sands (1986), d'Abrera (1990).

**H.* species (Sands, 1986; in collection of E. Tsukada)

Range (E).— Sulawesi (C). According to Sands (1986) this species, collected at Palopo in 1978, belongs to the *H. chrysanthis*-group (a group comprising only three other species: the western *coelisparsus* (noted by Parsons, 1999, as occurring on Sulawesi, but unconfirmed here), *H. apollo* Miskin from Queensland and New Guinea, and *chrysanthis* Felder from central Maluku), and is probably most closely related to *chrysanthis* itself.

Arhopalini Bingham,1907
(oakblues — Pl. 7, figs 7-9)

Range.— Oriental and Australian Regions, with slight extension into Palaearctic; about 250 species in six genera, the great majority of which belong to *Arhopala* s.l. Four of the genera are represented in the Sulawesi Region.

Foodplants.— Anacardiaceae, Barringtoniaceae, Boraginaceae, Chrysobalanaceae, Clusiaceae, Combretaceae, Ehretiaceae, Euphorbiaceae, Fabaceae, Fagaceae, Lauraceae, Loranthaceae, Lythraceae, Malvaceae, Meliaceae, Myrtaceae, Sapindaceae, Sterculiaceae, Verbenaceae. Attended by ants.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

Arhopala Boisduval, 1832

(oakblues — Pl. 7, fig. 7)

Range (W).— Oriental and Australian Regions, extending to Australia, the Solomon Islands and Japan. About 200 species, with at least 12 occurring on Sulawesi (in contrast, Seki *et al*., 1991, list some 90 species from Borneo).

Foodplants.— Most species on Fagaceae or Euphorbiaceae, but using a wide range of other plant families as well. The Fabaceae are positively recorded for only two species, *A. pseudocentaurus* and *A. similis* (Peter Seufert unpublished; Megens, 2002). All species appear to be attended by ants, either facultatively or in an obligate relationship (the latter with e.g. *Oecophylla, Crematogaster*: Maschwitz *et al*., 1984; Fiedler & Seufert, 1995; Fiedler, 1996b). One Australian species (*A. wildei*) is myrmecophagous inside *Polyrhachis* nests.

Key works.— Corbet (1941, 1946b), Evans (1957a), Eliot (1963, 1972), Corbet & Pendlebury (1992), Seki *et al*. (1991), Megens (2002).

A. eridanus Felder, 1860

(Pl. 7, fig. 7)

Range (1+3+4).— Philippines (Balabac, Cuyo, Palawan), Sulawesi Region, N & C Maluku.

— **A. eridanus lewara* Ribbe, 1926

Range.— Sulawesi, Kep. Banggai (Peleng: Hayashi, 1984).

— **A. eridanus elfeta* Hewitson, 1869

Range.— Kep. Sula (Mangole).

A. annulata Felder, 1860

Range (1+2+4).— Palawan, Philippines (Mindanao: Treadaway, 1995), Sulawesi (C), Kep. Banggai, central Maluku (Buru, Ambon).

**A. dohertyi* Bethune-Baker, 1903

(Doherty's Oakblue)

Range (E).— Sulawesi (S).

**A. irregularis* Bethune-Baker, 1903

Range (R).— Sulawesi, Kep. Banggai (Peleng).

**A. argentea* Staudinger, 1888

Range (E).— Sulawesi.

**A. sangira* Bethune-Baker, 1897

Range (L).— Kep. Sangihe.

**A. hercules* Hewitson, 1862

Range (E).— Sulawesi, ?northern Maluku (including Obi), ?New Guinea region (non-Sulawesi populations apparently excluded as separate species by Parsons, 1999).

**A. quercoides* Röber, 1886

Range (E).— Sulawesi (S).

A. cleander Felder, 1860

Range (2+4+5+6+7).— Burma, Malay Peninsula, Sumatra, Java, Lombok, Borneo, Philippines (Luzon, Camiguin de Luzon, Mindanao, Leyte, Negros, Sibutu: Treadaway, 1995), Sulawesi Region, central Maluku (including Buru), New Guinea region.

— **A. cleander sostrata* Fruhstorfer, 1914

Range.— Sulawesi (S), Salayar, Kep. Banggai.

A. phaenops Felder & Felder, 1865

Range (P).— Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (including Luzon and Mindanao: Treadaway, 1995), Kep. Sangihe, Kep. Talaud, Kep. Banggai, Maluku.

— **A. phaenops phaenops* Felder, 1865

Range.— ?Philippines, Kep. Sangihe, Kep. Talaud, Kep. Banggai (Peleng - Seki *et al*., 1991), northern Maluku.

A. alitaeus Hewitson, 1862

Range (1+2+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (including Luzon and Mindanao: Treadaway, 1995), Sulawesi Region.

— **A. alitaeus alitaeus* Hewitson, 1862

Range.— Sulawesi, Kep. Banggai.

**A. acetes* Hewitson, 1862

Range (R).— Sulawesi, Kep. Talaud, Kep. Tukangbesi, Kep. Banggai.

A. tephlis Hewitson, 1869

Range (3).— Sulawesi, northern Maluku.

— **A. tephlis bicolora* Röber, 1886

Range.— Sulawesi (S).

A. araxes Felder & Felder, 1865

Range (5+6).— Sumatra, Java, Lesser Sunda Islands, Sulawesi Region (records from New Guinea region not confirmed by Tennent, 2002, or Parsons, 1999; not known from Maluku).

— **A. araxes araxes* Felder & Felder, 1865

Range.— Sulawesi, Kep. Sangihe, ?Kep. Banggai, Kep. Sula (Mangole).

— **A. araxes talauta* Evans, 1957

Range.— Kep. Talaud.

— **A. araxes verelius* Fruhstorfer, 1914
Range.— Kalao.

A. philander Felder & Felder, 1865
Range (P).— Kep. Sangihe, Maluku, New Guinea region.
— *A. philander philander* Felder & Felder, 1865
Range.— Kep. Sangihe, N Maluku.

**A. straatmani* Nieuwenhuis, 1969
(Straatman's Oakblue)
Range (E).— Sulawesi.

A. species (Detani, 1983, as *pseudocentaurus* Doubleday, 1847)
Detani (1983) recorded an *Arhopala* from Kep. Banggai (Peleng) as an unnamed subspecies of *A. pseudocentaurus*. According to Harish Gaonkar (pers comm.), there has been a long-standing confusion over the identity of *A. centaurus* Fabricius, 1775, of which it now appears that *pseudocentaurus* is a strict synonym. Gaonkar has established that the original material of *centaurus* came from Java, not Malaya (Evans, 1957a) or Australia (e.g. Braby, 2000). Seki *et al*. (1991) do not list *pseudocentaurus* or *centaurus* from the Sulawesi Region. Without access to material, the identity of this *Arhopala* can only be guessed at.
Range (P).— Kep. Banggai (Peleng); probable wider range uncertain.

Flos Doherty, 1889
(plushblues — Pl. 7, fig. 8)

Range (1+2+5+6+7).— Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines and Sulawesi Region. About 10 species, four of which have been recorded from Sulawesi.
Foodplants.— Fagaceae, Lythraceae, Myrtaceae. Larvae always attended by ants (*Dolichoderus* spp.), probably an obligate relationship, as indicated by observations on Bornean *F. anniella* (pers. obs. K. Fiedler).
Key works.— Evans (1957a), Corbet & Pendlebury (1992).

F. diardi Hewitson, 1862
(Shining Plushblue)
Range (1+2+6+7).— Northern India, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (including Luzon, Mindanao and Tawitawi: Treadaway, 1995), Sulawesi.
Foodplant.— *Lithocarpus* (Fagaceae) (Corbet & Pendlebury, 1992).
Note.— Seki *et al*. (1991) do not list *diardi* for Sulawesi, so the specific assignment of *imperiosa* is perhaps questionable.
— **F. diardi imperiosa* Fruhstorfer, 1914
Range.— Sulawesi (S).

**F. kuehni* Röber, 1887
(Kuehn's Plushblue)

Range (R).— Sulawesi, Kep. Banggai.

**F. arca* de Nicéville, 1893

Range (E).— Sulawesi.

F. apidanus Cramer, 1777
(Plain Plushblue — Pl. 7, fig. 8)

Range (P).— Assam, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Lagerstroemia* (Lythraceae); *Eugenia, Syzygium* (Myrtaceae).

— *F. apidanus palawanus* Staudinger, 1889

Range.— Palawan, Balabac, Philippines (Luzon, Mindoro, Panay, Samar, Bohol, but not Mindanao - see Treadaway, 1995), ?Sulawesi.

Note.— Seki *et al*. (1991) include *apidanus* from Sulawesi without raising doubts, but this may refer to the next subspecies; the presence of this Philippine race on Sulawesi requires confirmation; Treadaway lists *F. apidanus himna* Fruhstorfer, 1914, from Mindanao.

— *F. apidanus apidanus* Cramer, 1779

Range.— Java to Sumbawa, Tanahjampea.

***Semanga* Distant, 1884**
(rededges — not illustrated)

Range (P).— Malay Peninsula, Sumatra, Java, Borneo, Sanga Sanga (Treadaway, 1995), Kep. Banggai. Two very rare species, discontinuously distributed, one being endemic to Banggai; the genus has not been recorded from Sulawesi.

Foodplants.— Including Fabaceae (*Saraca*); constantly attended by *Dolichoderus* ants (Fiedler & Seufert, 1995; Seufert & Fiedler, 1996b).

Key works.— Corbet & Pendlebury (1992), d'Abrera (1986).

**S. helena* Röber, 1887
(Helena Rededge)

Range (L).— Kep. Banggai.

***Surendra* Moore, 1879**
(acacia blues — Pl. 7, fig. 9)

Range (1+2+6+7).— Sri Lanka, India, China, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi. A small genus of about three to five species, represented by a single species in Sulawesi, at the eastern limit of the range.

Note.— Takanami (1989) appears to regard *S. v. samina* as a separate Sulawesi endemic, but we prefer here to follow Cantlie (1962) in recognising only three species within the genus; further work is evidently required.

Foodplants.— Fabaceae (*Acacia*, *Albizia, Paraserianthes*); facultatively attended by various ants.

Key works.— Cantlie (1962, 1964), d'Abrera (1986), Takanami (1989), Fiedler (1992b).

S. vivarna Horsfield, 1829
(Acacia Blue — Pl. 7, fig. 9)

Range (1+6+7).— As genus, except not recorded from China, or on Philippines proper (where it is replaced by *S. manilana* Felder & Felder: see Treadaway, 1995, who records *S. vivarna* from Balabac, Palawan and Calamian group only). See also note above (under genus) regarding status of subspecies *samina*.

Larvae facultatively attended by ants (e.g. *Anoplolepis*: Maschwitz *et al*. 1985b)

— **S. vivarna samina* Fruhstorfer, 1904

Note.— Igarashi & Fukuda (2000) list this taxon as a separate species.

Foodplants.— *Acacia* (Fabaceae).

Range.— Sulawesi, ?Kep. Banggai.

Amblypodiini Doherty, 1886
(leaf, fig-tree and silverstreak blues — Pl. 7, figs 10, 11)

Range.— Palaeotropics; a small tribe of three genera, two of which occur in the Oriental Region; both are known from Sulawesi.

Foodplants.— Celastraceae, Dipterocarpaceae, Moraceae, Olacaceae, Rubiaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

***Amblypodia* Horsfield, 1829**
(leaf blues — Pl. 7, fig. 10)

Range (W).— Oriental and Australian Regions, east to the Solomon Islands (Tennent, 2002), but not Australia. A genus of about 15 species, with a single representative in Sulawesi.

Foodplants.— Olacaceae. Ant-associations not positively recorded.

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992).

A. narada Horsfield, 1829
(Blue Leaf Blue — Pl. 7, fig. 10)

Range (1+2+3+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi, northern Maluku.

Foodplants.— *Olax* (Olacaceae).

— **A. narada confusa* Riley, 1922

Range.— Sulawesi, Kep. Banggai (Peleng).

***Iraota* Moore, 1881**
(silverstreak blues — Pl. 7, fig. 11)

Range (1+2+5+6+7).— Oriental Region, including Lesser Sunda Islands (Takanami, 1986a), Philippines and Sulawesi Region. A small genus of about four species, with a single member represented on Sulawesi.

Foodplants.— Moraceae.

Key works.— Corbet & Pendlebury (1992), Takanami (1985), d'Abrera (1986), Seki *et al*. (1991).

I. rochana Horsfield, 1829
(Scarce Silverstreak Blue — Pl. 7, fig. 11)

Range (1+2+6+7).— Assam, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Ficus* (Moraceae).

— **I. rochana johnsoniana* Holland, 1890

Range.— Sulawesi (S).

— **I. rochana mangolina* Fruhstorfer, 1911

Range.— Kep. Sula (Mangole).

Hypotheclini Eliot, 1973
(Pl. 7, fig. 12)

Range.— Papuan Region and Wallacea (Philippines and Sulawesi). A small group of two genera, one of which occurs in Sulawesi.

Key works.— Eliot (1973).

***Hypothecla* Semper, 1890**
(Pl. 7, fig. 12)

Range (1+2).— Palawan, Philippines (Treadaway, 1995) and Sulawesi Region. Two rare species.

Key works.— d'Abrera (1986).

**H. honos* de Nicéville, 1898
(Pl. 7, fig. 12)

Range (R).— Sulawesi, Kep. Banggai (Peleng; Nieuwenhuis, 1946).

Loxurini Swinhoe, 1910
(imperials, yamflies — Pl. 7, fig. 13)

Range.— Oriental Region and Wallacea. Six genera, only one of which is found in Sulawesi. According to Eliot (*in* Corbet & Pendlebury, 1978), this and the next two tribes are closely related and should perhaps be combined.

Foodplants.— Dioscoreaceae, Smilacaceae, Solanaceae; some species attended by ants (Fiedler, 1994a).

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

***Loxura* Horsfield, 1829**
(yamflies — Pl. 7, fig. 13)

Range (1+2+5+6+7).— Sri Lanka to Sundaland, Palawan, Philippines, Lesser Sunda Islands and southern Sulawesi Region. Two species, the more widespread of which occurs on Sulawesi.

Foodplants.— As tribe.
Key works.— d'Abrera (1986).

L. atymnus Stoll, 1780
(Yamfly — Pl. 7, fig. 13)

Range (5+6+7).— Sri Lanka, India, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Luzon: Treadaway, 1995), Sulawesi Region.

Foodplants.— *Dioscorea* (Dioscoreaceae); *Smilax* (Smilacaceae); *Solanum* (Solanaceae). Igarashi & Fukuda (2000) illustrate all life stages.

— **L. atymnus sulawesiensis* Takanami, 1986
Range.— Sulawesi (S).

— **L. atymnus* subsp. (BMNH)
Range.— Kep. Tukangbesi.

— **L. atymnus* subsp. (BMNH)
Range.— Kalao.

Horagini Swinhoe, 1910
(Pl. 7, fig. 14)

Range.— Oriental Region, from Sri Lanka to Taiwan and eastwards to New Guinea. Two genera, only one of which occurs in Sulawesi; the other, which is monobasic, is restricted to the Indian subregion.

Foodplants.— Bombacaceae, Coriariaceae, Euphorbiaceae, Lauraceae, Loranthaceae, Myrtacae, Rubiaceae, Sapindaceae, Styracaceae.

Key works.— Cowan (1966b), Eliot (1973), Corbet & Pendlebury (1992).

***Horaga* Moore, 1881**
(onyxes — Pl. 7, fig. 14)

Range (W).— As tribe, including the Philippines, Maluku and Lesser Sunda Islands. About ten species, four of which are found on Sulawesi.

Foodplants.— Bombacaceae (Kuroko & Lewvanich, 1993), Coriariaceae, Euphorbiaceae (Fiedler, 1991; Igarashi & Fukuda, 2000), Lauraceae (Bascombe *et al.*, 1999). Ant-associations so far unknown.

Key works.— Cowan (1966b), Corbet & Pendlebury (1992), Eliot (1986a), d'Abrera (1986), Seki *et al*. (1991), Schroeder *et al.* (2001).

H. syrinx Felder, 1860
(Yellow Onyx)

Range (W).— Northern India, Malay Peninsula, Sumatra, Java, Bali, Lombok (Parsons, 1999), Borneo, Palawan, Philippines (Treadaway, 1995; Schroeder *et al*., 2001), Sulawesi, N & C Maluku, New Guinea (Parsons, 1999).

— **H. syrinx permagna*, Fruhstorfer, 1912
Range.— Sulawesi (N, C).

**H. selina* Grose Smith, 1895
(Pl. 7, fig. 14)

Range (E).— Sulawesi (C, S).

H. chalcedonyx Fruhstorfer, 1914

Range (2+6+7).— Singapore, Bali, Borneo, Philippines (Luzon, Marinduque, Negros: Treadaway, 1995; Sibutu, Mindoro, Mindanao: Schroeder *et al*., 2001), Sulawesi.

— **H. chalcedonyx taweya* Cowan, 1966

Range.— Sulawesi (C).

**H. sohmai* Osada, 2001

Range (E).— Sulawesi (C, S; Osada, 2001).

Cheritrini Swinhoe, 1910
(imperials, posies — Pl. 7, fig. 15)

Range.— Afrotropical and Oriental Regions. Of the four Oriental genera, only one is represented on Sulawesi.

Foodplants.— ?Annonaceae (oviposition only), Barringtoniaceae, Clusiaceae, Dipterocarpaceae, Fabaceae, Lauraceae, Lecythidaceae, Meliaceae, Myrtaceae, Rubiaceae, Sapindaceae.

Key works.— Cowan (1967), Eliot (1973), Corbet & Pendlebury (1992).

***Drupadia* Moore, 1884**
(posies — Pl. 7, fig. 15)

Range (1+2+6+7).— India to Java, Philippines and Sulawesi. About 15 species, one of which occurs in Sulawesi.

Foodplants.— As tribe; attended by ants (e.g. *Crematogaster*, *Pheidole*), either in facultative or obligate relationship (Fiedler, 1996b).

Key works.— Cowan (1974), Corbet & Pendlebury (1992), d'Abrera (1986), Seki *et al*. (1991).

D. theda Felder & Felder, 1862
(Dark Posy — Pl. 7, fig. 15)

Range (1+2+7).— Burma, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— ?Annonaceae (oviposition only); *Barringtonia* (Barringtoniaceae); *Saraca, Bauhinia*, *Millettia* (Fabaceae); *Garcinia* (Clusiaceae); *Lansium* (Meliaceae); *Ixora* (Rubiaceae); *Arytera, Pometia, Lepisanthes* (Sapindaceae), always at young growth or inflorescences (Seufert & Fiedler, 1996a; Igarashi & Fukuda, 2000). Obligate association with *Crematogaster* ants (Maschwitz *et al*., 1985a; Seufert & Fiedler, 1996a,b). Igarashi & Fukuda (2000) illustrate the early stages.

— **D. theda thaliarchus* Staudinger, 1888

Range.— Sulawesi (N).

— **D. theda inexpectata* Ribbe, 1926

Range.— Sulawesi (C).

— **D. theda namusa* Hewitson, 1863
Range.— Sulawesi (S).
— **D. theda bangkaiensis* Ribbe, 1926
Range.— Kep. Banggai.

Aphnaeini Distant, 1884
(silverlines — not illustrated)

Range.— Afrotropical, Oriental and Palaearctic Regions. This large group of species, divided into about 16-18 genera, is primarily Afrotropical; represented in the Oriental Region by a few species of *Spindasis*.

Foodplants.— Anacardiaceae, Asteraceae, Bruniaceae, Capparaceae, Cistaceae, Combretaceae, Convolvulaceae, Crassulaceae, Dioscoreaceae, Ebenaceae, Elaeagnaceae, Euphorbiaceae, Fabaceae, Loranthaceae, Malpighiaceae, Malvaceae, Melastomaceae, Myrsinaceae, Myrtaceae, Olacaceae, Pinaceae, Polygonaceae, Proteaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Sterculiaceae, Thymelaceae, Verbenaceae, Zygophyllaceae; attended by ants, and some may feed additionally on ant regurgitations, or perhaps even ant brood.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

***Spindasis* Wallengren, 1857**
(silverlines — not illustrated)

Range (P).— Afrotropical and Oriental Regions, extending to China, Japan, Malay Peninsula, Sumatra, Java, Borneo, Philippines and the Sulawesi Region (Buton). Well over 30 species are known, with about six occurring in the Malay Archipelago.

Foodplants.— Asteraceae, Capparaceae, Combretaceae, Convolvulaceae, Dioscoreaceae, Eleagnaceae, Euphorbiaceae, Fabaceae, Loranthaceae, Malpighiaceae, Malvaceae, Melastomaceae, Myrtaceae, Olacaceae, Pinaceae, Proteaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Verbenacae, Zygophyllaceae; attended by ants.

Key works.— Corbet & Pendlebury (1992), d'Abrera (1986), Seki *et al*. (1991).

S. vulcanus Fabricius, 1775
(Common Silverline)

Range (P).— Sri Lanka, India, Burma, Thailand, Java, Buton.

Foodplants.— *Cadaba* (Capparaceae); *Ziziphus* (Rhamnaceae); *Canthium* (Rubiaceae); *Allophylus* (Sapindaceae); *Clerodendrum* (Verbenaceae) (all from India: Bell, 1919); always and obligately associated with *Crematogaster* (Formicidae).
— **S. vulcanus* subsp. (Jurriaanse & Lindemans, 1920).
Range.— Buton.

Iolaini Verity, 1943
(royals, imperials — Pl. 7, figs 16-18)

Range.— Palaeotropics. A large group with at least 16 genera in the Oriental

Region, of which only three are found on Sulawesi.

Foodplants.— Fabaceae, Hydrangeaceae, Loranthaceae, Olacaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

Tajuria **Moore, 1881**

(royals — Pl. 7, fig. 16)

Range (1+2+6+7).— Sri Lanka to Taiwan, Java, Philippines and Sulawesi. A somewhat heterogeneous assemblage of about 40 species, four of which are known to occur on Sulawesi.

Foodplants.— Fabaceae, Hydrangeaceae, Loranthaceae.

Key works.— Corbet & Pendlebury (1992), d'Abrera (1986), Takanami (1989), Seki *et al*. (1991), Seki (1997).

T. mantra Felder & Felder, 1860

(Felder's Royal)

Range (1+2+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Palawan (Treadaway, 1995), Philippines, Sulawesi Region.

Foodplants.— *Dendrophthoe, Scurrula* (Loranthaceae). Igarashi & Fukuda (2000) illustrate the pupa.

— **T. mantra jalysus* Felder & Felder, 1865

Range.— Sulawesi, Kep. Banggai.

**T. cyrillus* Hewitson, 1865

(Pl. 7, fig. 16)

Range (E).— Sulawesi (C, S).

**T.* species (BMNH; d'Abrera, 1986)

Range (E).— Sulawesi (C: Palu region).

**T. iapyx* Hewitson, 1865

Range (R).— Sulawesi Region, ?Maluku.

— **T. iapyx iapyx* Hewitson, 1865

Range.— Sulawesi.

— **T. iapyx bangkaianus* Ribbe, 1926

Range.— Kep. Banggai.

— **T. iapyx* subsp. (BMNH)

Range.— Kep. Tukangbesi (Kaledupa).

— **T. iapyx* subsp. (BMNH)

Range.— Kep. Sula (Mangole, Sanana).

Pratapa **Moore, 1881**

(not illustrated — *cf.* Pl. 7, fig. 17)

Range (1+2+5+6+7).— Sri Lanka, India, China, Malay Peninsula, Greater and Lesser Sundas, Palawan, Philippines (Treadaway, 1995), Sulawesi. Six species (Seki, 1997).

Key works.— d'Abrera (1986), Seki (1997).

**P. cameria* de Nicéville, 1898*

Range (E).— Sulawesi (C, S).

***Paruparo* Takanami, 1982**
(not illustrated — *cf*. Pl. 7, fig. 17)

Range (1+2+6+7).— Sri Lanka, India, Malay Peninsula, Sumatra, Java, Borneo, Philippines and Sulawesi Region. A group of about a dozen species, several of which have only recently been described from the Philippines, where the genus is most well represented; a single very rare species occurs in the Sulawesi Region.

Note.— Seki & Takanami (1990) moved the Sulawesi species from *Eliotia* Hayashi 1978 (=*Rachana* Eliot, 1978; *Eliotia* Hayashi preoccupied) to *Paruparo* Takanami, 1982. The generic placement of species in *Paruparo*, *Rachana* (and possibly *Pratapa* and *Eliotiana*: Eliot & Kirton, 2000) needs clarification. Treadaway (1995) lists several *Rachana* (as *Eliotia*) and several *Paruparo* from the Philippines. A species from the Andaman islands that has been placed in *Rachana* is illustrated on Pl. 7 (fig. 17).

Foodplants.— Loranthaceae (*Loranthus*).

Key works.— Hayashi (1978), Eliot *in* Corbet & Pendlebury (1978), d'Abrera (1986), Seki & Takanami (1990).

**P. kuehni* Röber, 1887*

Range (R).— Sulawesi, Kep. Banggai.

— **P. kuehni regulus* Staudinger, 1888*

Range.— Sulawesi (N).

— **P. kuehni birumki* Ribbe, 1926*

Range.— Sulawesi (C).

— **P. kuehni kuehni* Röber, 1887*

Range.— Kep. Banggai.

***Dacalana* Moore, 1884**
(royals — Pl. 7, fig. 18)

Range (1+2+6+7).— Northern India to Java, Philippines and Sulawesi Region. A group of about 20 species, well represented in the Philippines (there have been several recent discoveries), and by three species in the Sulawesi Region.

Foodplants.— Loranthaceae.

Key works.— Eliot (1962), Corbet & Pendlebury (1992), d'Abrera (1986), Takanami (1989).

**D. anysis* Hewitson, 1865*
(Pl. 7, fig. 18)

Range (R).— Sulawesi, Kep. Banggai.

Foodplants.— *Scurrula* (Loranthaceae). Igarashi & Fukuda (1997, 2000) illustrate the foodplant, larva and pupa.

— **D. anysides* Röber, 1887
Range (E).— Sulawesi.

**D. sangirica* Fruhstorfer, 1912
Range (L).— Kep. Sangihe, Kep. Talaud.

Remelanini Eliot, 1973
(royals — Pl. 7, fig. 19)

Range.— Oriental Region, Wallacea and Lesser Sunda Islands. A small tribe comprising three genera, one of which occurs in Sulawesi.

Foodplants.— Bombacaceae, Ericaceae, Euphorbiaceae, Fabaceae, Hypericaceae, Loranthaceae, Myrsinaceae, Rubiaceae, Sapindaceae, Sterculiaceae, Verbenaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

***Remelana* Moore, 1884**
(royals — Pl. 7, fig. 19)

Range (1+2+5+6+7).— Oriental Region, except Sri Lanka and southern India, extending to Palawan, Philippines, Sulawesi and Lesser Sunda Islands. Two species, one very widespread, the other restricted to the Philippines (see Treadaway, 1995).

Foodplants.— Bombacaceae (*Durio*: Kuroko & Lewvanich, 1993); Ericaceae (*Rhododendron*); Euphorbiaceae (Bascombe *et al.,* 1999); Fabaceae (gen. indet.: K. Fiedler, pers. obs. in Borneo); Hypericaceae; Myrsinaceae; Myrtaceae (*Cleistocalyx*: Young, 1998); Rhizophoraceae (*Kandelia*: Young, 1998); Rubiaceae, Sapindaceae (*Litchi*: Young, 1998), Sterculiaceae; Theaceae (*Eurya*: Young, 1998); Verbenaceae (Bascombe *et al.,* 1999); facultatively attended by ants (e.g. *Anoplolepis* in Borneo, *Polyrachis* in Hong Kong).

Key works.— Corbet & Pendlebury (1992), d'Abrera (1986).

R. jangala Horsfield, 1829
(Chocolate Royal — Pl. 7, fig. 19)
Range (1+2+5+6+7).— As genus.
Foodplants.— As genus. Young (1998) illustrates all life stages (Hong Kong).
— **R. jangala orsolina* Hewitson, 1865
Range.— Sulawesi, Kep. Banggai (Peleng).

Hypolycaenini Swinhoe, 1910
(tits — Pl. 7, fig. 20)

Range.— Afrotropical and Oriental Regions, extending to Australia. Well represented in Africa, with one genus in Indo-Australia (Fiedler, 1992a, regards *Chliaria* Moore and *Zeltus* de Nicéville as synonymous with *Hypolycaena*).

Foodplants.— Aizoaceae, Bignoniaceae, Bombacaceae, Clusiaceae, Combretaceae, Connaraceae, Crassulaceae, Cucurbitaceae, Fabaceae, Flagellariaceae, Lauraceae, Lecythidaceae, Loganiaceae, Loranthaceae, Meliaceae, Myrsinaceae, Myrtaceae, Olacacaeae,

Opiliaceae, Orchidaceae, Proteaceae, Punicaceae, Rhamnaceae, Rhizophoraceae, Rubiaceae, Sapindaceae, Smilacaceae and Verbenaceae; sometimes or always attended by ants (Fiedler, 1991, 1992a).

Key works.— Eliot (1973), Corbet & Pendlebury (1992), Takanami (1989), Larsen (1991), Fiedler (1991).

Hypolycaena **Felder & Felder, 1862**

(tits — Pl. 7, fig. 20)

Range (W).— As tribe. About 25 species in the Indo-Australian region (Fiedler, 1992a), of which 4 are found on Sulawesi, and about 20 species in Africa (Ackery *et al*., 1995).

Foodplants.— As tribe, except not recorded from Aizoaceae or Crassulaceae, sometimes or always attended by ants (e.g. *Camponotus, Crematogaster, Oecophylla, Polyrhachis*).

Key works.— Common & Waterhouse (1981), d'Abrera (1986), Fiedler (1991, 1992a), Corbet & Pendlebury (1992).

H. erylus Godart, 1824

(Common Tit)

Range (W).— Northern India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region.

Foodplants.— *Ceiba* (Bombacaceae); *Lumnitzera* (Combretaceae); *Agelaea* (Connaraceae); *Acacia, Paraserianthes, Saraca* (Fabaceae); *Garcinia* (Clusiaceae: Igarashi & Fukuda, 2000); *Cinnamomum* (Lauraceae); Fagraea (Loganiaceae); *Dendrophthoe, Helixanthera* (Loranthaceae); *Sandoricum* (Meliaceae); *Eugenia* (Myrtaceae); *Champereia* (Opiliaceae); *Dimocarpus* (Sapindaceae: Kuroko & Lewvanich, 1993); *Macadamia* (Proteaceae); *Zizyphus* (Rhamnaceae); *Bruguiera, Rhizophora* (Rhizophoraceae); *Ixora, Nauclea* (Igarashi & Fukuda, 2000), *Scyphiphora* (Seufert, 1997), *Vangueria* (Rubiaceae); *Clerodendron* (Verbenaceae); always attended by ants (*Oecophylla smaragdina*; Fiedler, 1996b). Igarashi & Fukuda (2000) illustrate the larvae attended by ants, and the pupa.

— * *H. erylus gamatius* Fruhstorfer, 1912

Range.— Sulawesi, Kep. Talaud, Kep. Sangihe (Siao), Kep. Tukangbesi, Kep. Sula (Mangole).

**H. umbrata* Seki & Takanami, 1988

Range (E).— Sulawesi (C).

H. sipylus Felder, 1860 (= *lewara* Ribbe, *kalawara* Ribbe)

(Pl. 7, fig. 20)

Range (1+2+3+4+5+6).— Eastern Java, Lesser Sunda Islands, Balabac, Palawan, Philippines, Sulawesi Region, N & C Maluku, ?New Guinea (not noted in Parsons, 1999); no record for Borneo (Seki *et al*., 1991).

Foodplant.— *Eugenia* (Myrtaceae: Semper 1890), recorded as *tharrytas* from Manila. Igarashi & Fukuda (2000), who illustrate the early stages and the larva attended by

ants, report the larvae from ornamental *Ixora* (Rubiaceae) in the Philippines.

— **H. sipylus giscon* Fruhstorfer, 1912

Range.— Sulawesi, Tanahjampea, Kalao, Kep. Tukangbesi, Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana).

**H. xenia* Grose Smith, 1895 (= *celebica* Ribbe, J. N. Eliot, pers. comm.)

Range (E).— Sulawesi.

Deudorigini Doherty, 1886

(cornelians, planes, flashes — Pl. 7, figs 21-25)

Range.— Afrotropical and Oriental, extending weakly into Palaearctic and Australian Regions. A large grouping which includes eight genera in the Oriental Region, five of which are found on Sulawesi.

Foodplants.— Aitoniaceae, Anacardiaceae, Apiaceae, Arecaceae, Caprifoliaceae, Celastraceae, Combretaceae, Connaraceae, Elaeocarpaceae, Eleagnaceae, Ericaceae, Euphorbiaceae, Fabaceae, Fagaceae, Hippocastanaceae, Hippocrateaceae, Loganiaceae, Loranthaceae, Lythraceae, Melastomataceae, Myrtaceae, Olacaceae, Oleaceae, Oxalidaceae, Pinaceae, Piperaceae, Pittosporaceae, Poaceae, Proteaceae, Punicaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapothaceae, Saxifragaceae, Solanaceae, Symplocaceae, Theaceae, Verbenaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

***Bindahara* Moore, 1881**

(planes — Pl. 7, fig. 21)

Range (1+2+4+5+6+7).— Oriental and Australian Regions, from Sri Lanka to Australia and the Solomon Islands. Three species, one of which occurs on Sulawesi.

Foodplants.— Celastraceae (*Celastris*, *Euonymus, Salacia*; larvae in fruits), Rhamnaceae. Ant-associations not recorded.

Key works.— Corbet & Pendlebury (1992), Common & Waterhouse (1981).

B. phocides Fabricius, 1793

(Plane — Pl. 7, fig. 21)

Range (1+2+4+5+6+7).— As genus, including Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region and C Maluku (Buru).

Foodplants.— As genus. Igarashi & Fukuda (2000) illustrate all life stages.

— **B. phocides fumata* Röber, 1887

Range.— Sulawesi, Kep. Talaud, Kep. Banggai, Kep. Sula (Mangole, Sanana).

***Rapala* Moore, 1881**

(flashes — Pl. 7, fig. 22)

Range (W).— Oriental Region, extending eastwards into Palaearctic and Australian Regions. A genus of about 30 or more species, often very local, with six occurring

on Sulawesi; Takanami (1998) lists 28 species from "the southeast Asian Islands".

Foodplants.— Anacardiaceae, Annonaceae, Caprifoliaceae, Combretaceae, Connaraceae, Elaeagnaceae, Ericaceae, Euphorbiaceae, Fabaceae, Fagaceae, Lythraceae, Melastomataceae, Myrtaceae, Oleaceae, Oxalidaceae, Piperaceae, Rhamnaceae, Rosaceae, Sapindaceae, Saxifragaceae, Symplocaceae, Theaceae, Ulmaceae, Verbenaceae. Attended by ants (e.g. *Iridomyrmex*), either facultatively or in obligate relationship (Fiedler, 1996b).

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Takanami (1989, 1992a, 1998), Seki *et al*. (1991).

**R. ribbei* Röber, 1886

Range (E).— Sulawesi.

**R. dioetas* Hewitson, 1869 (? = *zylda* Seitz, [1922])
(Pl. 7, fig. 22 — *zylda*)

Range (R).— Sulawesi, Kep. Sangihe, Kep. Talaud, Kep. Banggai, Salayar.

Foodplants.— *Lagerstroemia* (Lythraceae) (recorded by Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

**R. enipeus* Staudinger, 1888 (= *cindy* d'Abrera, 1986)

Range (R).— Sulawesi, Salayar, Kep. Banggai, Manui (Takanami, 1992a).

**R. cassidyi* Takanami, 1992

Range (E).— Sulawesi (N, C).

R. manea Hewitson, 1863
(Slate Flash)

Range (1+2+5+6+7).— Sri Lanka, India, southern China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan (Treadaway, 1995), Philippines, Sulawesi Region.

Foodplants.— *Mangifer* (Anacardiaceae); *Viburnum* (Caprifoliaceae); *Quisqualis* (Combretaceae: Wynter Blyth 1982, under *R. schistacea* from India); *Antidesma* (Euphorbiaceae); *Acacia*, *Albizia*, *Bauhinia, Lasiobema, Millettia, Pueraria* (Fabaceae); *Lithocarpus* (Fagaceae); *Jasminum* (Bascombe *et al.,* 1999) (Oleaceae); *Ziziphus* (Rhamnaceae); *Photinia, Sorbaria, Spiraea* (Rosaceae); *Nephelium, Dimocarpus* (Kuroko & Lewvanich, 1993) (Sapindaceae); *Camellia*, *Gordonia* (Theaceae); *Lantana* (Verbenaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— **R. manea manea* Hewitson, 1863

Range.— Sulawesi, Kep. Talaud, Salayar, Tanahjampea, Kalao, Buton, Kep. Banggai (Peleng), Kep. Sula (Mangole).

R. varuna Horsfield, 1829
(Indigo Flash)

Range (W).— Sri Lanka, India, Taiwan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, N & C Maluku, New Guinea region, Australia.

Foodplants.— *Quisqualis* (Combretaceae); *Acacia, Dendrolobium* (Fabaceae); *Psidium* (Myrtaceae); ?*Buckinghamia* (Proteaceae); *Alphitonia*, *Zizyphus* (Rhamnaceae); *Litchi, Sapindus* (Wynter Blyth, 1982; from India), *Nephelium* (Kuroko & Lewvanich, 1993) (Sapindaceae); *Gordonis* (Theaceae); *Celtis* (Ulmaceae: Shen-Horn Yen *in litt.*, from Taiwan); Verbenaceae.

— **R. varuna olivia* Druce, 1895

Range.— Sulawesi (S).

***Deudorix* Hewitson, 1863**

(cornelians, playboys — Pl. 7, fig. 23)

Range (W).— Oriental, Australian and Pacific Regions, from Sri Lanka to Samoa; also Afrotropical Region. A genus of about 35 species (excluding the African members, many of which are often placed in the genus or subgenus *Virachola* Moore, 1881), with three occurring on Sulawesi.

Foodplants.— Aitoniaceae, Apiaceae, Arecaceae, Celastraceae, Combretaceae, Connaraceae, Elaeocarpaceae, Euphorbiaceae, Fabaceae, Hippocastanaceae, Loganiaceae, Loranthaceae, Lythraceae, Myrtaceae, Olacaceae, Pinaceae, Pittosporaceae, Poaceae, Proteaceae, Punicaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae, Theaceae. Larvae of most species only occasionally attended by ants.

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992), Common & Waterhouse (1981).

**D. cleora* Miller & Miller, 1986

(Millers' Playboy)

Range (E).— Sulawesi (N).

Note.— Known only from the holotype, preserved in the Allyn Museum, this striking species was discovered in the Tondano area in 1940.

D. epijarbas Moore, 1858

(Cornelian — Pl. 7, fig. 23)

Range (W).— As genus, including Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region and N & C Maluku.

Foodplants.— Typically fruits belonging to a variety of families, including Arecaceae; *Connarus* (Connaraceae); *Elaeocarpus* (Elaeocarpaceae); *Drypetes, Euphorbia*, *Phyllanthes* (Euphorbiaceae); *Bauhinia, Cynometra* (Fabaceae); seed capsules of *Aesculus* (Hippocastanaceae); *Pinus* (Pinaceae); *Panicum* (Poaceae); Proteaceae; *Punica* (Punicaceae); *Dimocarpus*, *Euphoria, Lepisanthes, Litchi, Nephelium*, *Sapindus* (Sapindaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— **D. epijarbas megakles* Fruhstorfer, 1911

Range.— Sulawesi, Kep. Talaud, Kalao, Kep. Banggai.

**D. loxius* Hewitson, 1869

Range (E).— Sulawesi.

Artipe Boisduval, 1870
(green flashes — Pl. 7, fig. 24)

Range (7).— Northern India, China, Indo-China, Malay Peninsula, Taiwan, Borneo, Sulawesi and New Guinea region: not known from Sumatra, Java, Lesser Sunda Islands, Philippines and Maluku. A small genus (about six species; Parsons 1999) with a curious distribution; one of the species reaches southern Sulawesi.

Foodplants.— ?Lythraceae, Rubiaceae.

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992).

A. eryx Linnaeus, 1771
(Green Flash — Pl. 7, fig. 24)

Range (7).— As genus.

Foodplants.— ?Lythraceae (Fiedler, 1991); fruits of *Gardenia*, *Randia* (Rubiaceae). Osada (1997) illustrates *Randia* and the damage done to the fruits by *Artipe*.

— **A. eryx alax* Eliot, 1956

Range.— Sulawesi (S).

Sinthusa Moore, 1884
(sparks — Pl. 7, fig. 25)

Range (1+2+6+7).— Oriental Region, from northern India to Taiwan and Java to Palawan, Philippines and Sulawesi; absent from Maluku and the Lesser Sunda Islands. A group of about a dozen species, at least two of which occur on Sulawesi.

Foodplants.— Rosaceae (*Rubus*).

Key works.— Corbet & Pendlebury (1992), d'Abrera (1986).

**S. verriculata* Snellen, 1892
(Pl. 7, fig. 25)

Range (R).— Sulawesi (SE), Kep. Banggai (Peleng), ?Kep. Sula (Sanana).

Note.— The nominal taxon *verena* Grose Smith is treated here as a synonym of *verriculata*, but this needs confirmation; two males in BMNH from Sanana may represent a further species.

**S. indrasari* Snellen, 1878

Range (R).— Sulawesi, Kep. Banggai.

Polyommatinae Swainson, 1827
(blues and coppers — Pl. 8)

Range.— The Polyommatinae are a very large, cosmopolitan group of well over 1000 species, divided into four unequal tribes of which only the largest, the Polyommatini, and the Lycaenesthini (represented by *Anthene*) occur in the Sulawesi Region.

Foodplants.— Many families of plants, including Aizoaceae, Amaranthaceae, Boraginaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Loranthaceae, Malpighiaceae, Meliaceae, Oxalidaceae, Plumbaginaceae, Proteaceae, Rhamnaceae, Rubiaceae, Ruta-

ceae, Sapindaceae, Ulmaceae, Urticaceae, Verbenaceae, Zingiberaceae, Zygophyllaceae. Some Polyommatini are associated with ants.

Key works.— Eliot (1973), d'Abrera (1977, 1986), Corbet & Pendlebury (1992), Hirowatari (1992).

Lycaenesthini Toxopeus, 1929

(ciliate blues, hairtails — Pl. 8, fig. 1)

Range.— Palaeotropics (mainly African). Seven genera are included, of which only one is represented in the Indo-Australian Region.

Foodplants.— Anacardiaceae, Combretaceae, Connaraceae, Crassulaceae, Escalloniaceae, Euphorbiaceae, Fabaceae, Fagaceae, Flagellariaceae, Lauraceae, Loranthaceae, Lythraceae, Malpighiaceae, Meliaceae, Melianthaceae, Myricaceae, Myrtaceae, Rosaceae, Rubiaceae, Sapindaceae, Smilacaceae, Sterculiaceae, Ulmaceae, Verbenaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992).

Anthene Doubleday, 1847

(ciliate blues, hairtails — Pl. 8, fig. 1)

Range (W).— Palaeotropics. A large genus (*ca* 100 species), about 10 of which occur in the Indo-Australian region, four of them on Sulawesi.

Foodplants.— As tribe (except Loranthaceae); attended by ants (*Oecophylla*), at least some species in obligate relationships (Fiedler, 1996b).

Key works.— Tite (1966), Corbet & Pendlebury (1992).

A. lycaenina Felder, 1868

Range (1+2+5+6+7).— Sri Lanka to Malay Peninsula, Lombok, Palawan, Philippines (Treadaway, 1995), Sulawesi Region.

Foodplants.— *Buchanania* (Anacardiaceae); *Caesalpinia* (Fabaceae).

— **A. lycaenina* subsp.

Range.— Sulawesi, Kep. Banggai (Peleng) (Seki *et al*., 1991: 47).

A. paraffinis Fruhstorfer, 1916

Range (P).— Kep. Sula, Maluku, New Guinea, Bismarcks, Solomon Islands.

Foodplants.— ?*Saraca* (Fabaceae; Parsons, 1999).

— *A. paraffinis emoloides* Tite, 1966

Range.— Kep. Sula, C Maluku (Buru), New Guinea.

**A. philo* Hopffer, 1874

Range (R).— Sulawesi Region.

— **A. philo philo* Hopffer, 1874

Range.— Sulawesi, Salayar, Kep. Tukangbesi, Kep. Banggai, Kep. Sula.

— **A. philo scintillans* Tite, 1966

Range.— Kep. Sangihe, Kep. Talaud.

**A. lycaenolus* Tite, 1966

Range (L).— Kep. Talaud.

A. licates Hewitson, 1874
(Pl. 8, fig. 1)

Range (1+3).— Malay Peninsula, Sumatra, Palawan, Sanga Sanga (Treadaway, 1995), Sulawesi, Kep. Banggai, Maluku (Obi), New Guinea.

— **A. licates licates* Hewitson, 1874

Range.— Sulawesi, Kep. Banggai (Peleng).

**A. villosa* Snellen, 1878

Range (R).— Sulawesi, Kep. Sangihe (Sangihe, Siao), Kep. Talaud.

Polyommatini Swainson, 1827
(blues — Pl. 8, figs 2-35)

Range.— A vast, cosmopolitan assemblage, comprising most of the Polyommatinae. Over 30 genera are represented on Sulawesi.

Foodplants.— Including (in the Oriental Region), Aizoaceae, Amaranthaceae, Boraginaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Malpighiaceae, Meliaceae, Oxalidaceae, Plumbaginaceae, Proteaceae, Rhamnaceae, Rubiaceae, Rutaceae, Sapindaceae, Ulmaceae, Urticaceae, Zingiberaceae, Zygophyllaceae.

Key works.— Eliot (1973), Corbet & Pendlebury (1992), Eliot & Kawazoé (1983), Hirowatari (1986b).

***Cupidopsis* Karsch, 1895**
(meadow blues — not illustrated)

Range.— Afrotropical Region, including Madagascar and Yemen, with one of the three species anomalously recorded from Sulawesi (see below).

Foodplants (in Afrotropics).— Flowers, buds and seed pods of Fabaceae (*Eriosema*, *Rhynchosia*, *Vigna*); attended by ants.

Key works.— d'Abrera (1980), Ackery *et al.* (1995).

C. jobates Hopffer, 1855
(Tailed Meadow Blue)

Range.— Africa. Tennent (1996a) gives an account of the collection of a male specimen from a locality near Molibagu, Sulawesi Utara, during the 1985 Royal Entomological Society of London *Project Wallace* expedition. This apparently genuine record remains unexplained. In the rather unlikely event that this species does prove to be established on Sulawesi, plausibly it was introduced from Africa in seedpods of a forage plant such as *Vigna* (cowpea).

Foodplants (in Afrotropics).— *Eriosema*, *Rhynchosia* (Fabaceae).

***Una* de Nicéville, 1890**
(singeltons — Pl. 8, fig. 2)

Range (2+6+7).— Assam, Hainan, Malay Peninsula, Sumatra, Java, Borneo, Philippines (Mindanao), Sulawesi (C: Takanami, 1986b). One or two species.

Key works.— Schroeder & Treadaway (1986), Corbet & Pendlebury (1992), Hirowatari (1992).

U. usta Distant, 1886
(Singleton — Pl. 8, fig. 2)

Range (6+7).— As genus.

— *U. usta usta* Distant, 1886

Range.— As genus (including central Sulawesi), except Java and Philippines. According to Treadaway (1995), the Mindanao population represents a separate species (*U. philippensis* Schröder & Treadaway, 1986), but Hirowatari (1992) considered *Una* to be monobasic.

***Petrelaea* Toxopeus, 1929**
(dingy lineblues — Pl. 8, fig. 3)

Range (1+2+3+6+7).— Chagos Archipelago, Sri Lanka, India, Assam, Andaman Islands, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (Mindanao: Treadaway, 1995), Sulawesi, N & ?S Maluku, New Guinea, Bismarcks, northern Australia, Solomon Islands. Two species.

Key works.— Tite (1963), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Fujioka & Chiba (1988), Hirowatari (1992), Parsons (1999).

P. tombugensis Röber, 1886
(Eastern Dingy Lineblue - *cf.* Pl. 8, fig. 3)

Range (3).— Andaman Islands, ?Palawan, Sulawesi (N, E: Cassidy, 1990), Kep. Sula (Mangole), N Maluku (Bacan, Obi), New Guinea, Solomon Islands (Tennent, 2002), North Australia (Hirowatari, 1992), Ogasawara Islands (Hirowatari, 1992).

Note.— This distribution is based largely on Fujioka & Chiba (1988), but Hirowatari (1992) does not list the Andamans, describing *tombugensis* as a species "distributed eastward of Sulawesi" (sic); it is likely that this recently separated species will be recognised from a wider range of localities in future. Parsons (1999), following Fujioka & Chiba, considered that the two species were sympatric in the Andamans.

***Nacaduba* Moore, 1881**
(lineblues — Pl. 8, figs 4, 5)

Range (W).— Oriental, Australian and Pacific Regions, from Sri Lanka to Samoa and Tahiti. A large genus of 40 species (Hirowatari, 1992), at least 12 of which occur in the Sulawesi Region (Cassidy, 1990).

Foodplants.— Anacardiaceae, Dipterocarpaceae, Fabaceae, Myrsinaceae, Primulaceae, Proteaceae, Sapindaceae, Sapotaceae, Sterculiaceae, Ulmaceae; attended by ants (*Iridomyrmex, Prolasius*).

Key works.— Eliot (1955), Tite (1963), Corbet & Pendlebury (1992), Common & Waterhouse (1981), d'Abrera (1986), Hirowatari (1986b, 1990, 1992), Takanami (1990, 1992b), Cassidy (1990).

N. angusta H. Druce, 1873
(White Lineblue — Pl. 8, fig. 5)

Range (1+2+6+7).— India, Burma, Thailand, Indo-China (Hirowatari, 1992), Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region.

— **N. angusta pamela* Grose Smith, 1895

Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng), Kep. Sula (Sanana, Mangole).

— **N. angusta sangira* Fruhstorfer, 1916

Range.— Kep. Sangihe.

Takanami (1992b) points out that the name *azureus* Röber was for long misapplied to this species; on transfer of *azureus* to *N. pavana*, the senior name available for *N. angusta* from Sulawesi is *N. pamela*.

N. pactolus Felder, 1860
(Large 4-lineblue)

Range (1+2+4+5+6+7).— Sri Lanka, India, south China, Taiwan, Burma, Thailand, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands (Takanami, 1986a), Borneo, Palawan, Philippines, Sulawesi Region, C Maluku (Hirowatari, 1992), New Guinea region (including Aru: Takanami, 1992b), Solomon Islands (Tennent, 2002).

Foodplants.— *Entada* (Fabaceae: Bean, 1964); *Embelia* (Myrsinaceae: Wynter Blyth, from India). Facultatively attended by ants (e.g. *Camponotus*).

— **N. pactolus pactolides* Fruhstorfer, 1916

Range.— Sulawesi (N, C, S), Kep. Banggai, Kep. Talaud, Kep. Sula (Sanana).

N. pavana Horsfield, 1828
(Small 4-lineblue)

Range (1+2+6+7).— India, Burma, Malay Peninsula, Sumatra (Hirowatari, 1992), Java, Borneo (Seki *et al*., 1991; Hirowatari, 1992), Palawan, Philippines (Leyte, Sibuyan, Mindanao: Treadaway, 1995), Sulawesi.

— **N. pavana azureus* Röber, 1886

Range.— Sulawesi (N, C, E).

Takanami (1992b) explains the transfer of the name *azureus* Röber from *N. angusta*, to which species it was previously considered to refer, and the consequent synonymy of *N. pavana visuna* Fruhstorfer.

N. hermus Felder, 1860

Range (W).— Sri Lanka and India to Borneo (Seki *et al*., 1991), Java, Lombok, Philippines, Sulawesi, Maluku, New Guinea (Parsons, 1999).

Foodplants.— *Lannea* (Anacardiaceae); *Pongamia* (Fabaceae).

— *N. hermus hermus* Felder 1860

Range.— Sulawesi (Morowali District: Cassidy, 1990), Maluku (Obi, Seram, Ambon).

N. subperusia Snellen, 1896
(Violet 4-lineblue)

Range (1+2+3+5+6+7).— Assam, Malay Peninsula, Sumatra, Java, Sumba (Seki *et al*., 1991), Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region.

— *N. subperusia paska* Eliot, 1955

Range.— Palawan, Philippines (Treadaway, 1995), Sulawesi (N: Cassidy, 1990), Kep. Sula (Sanana), N Maluku.

N. sanaya Fruhstorfer, 1916

Range (2+3+4+6+7).— India, Burma, Malay Peninsula, Sumatra, Java, Borneo, Philippines (excluding Palawan: Treadaway, 1995), Sulawesi, Maluku (no details: Hirowatari, 1992).

— *N. sanaya metallica* Fruhstorfer, 1916

Range.— Philippines, Sulawesi (N), ?Kep. Banggai.

**N. angelae* Cassidy, 1990

Range (E).— Sulawesi (N).

N. berenice Herrich-Schäffer, 1869

(Rounded Six Lineblue — Pl. 8, fig. 4)

Range (W).— Oriental and Australian Regions, from Sri Lanka, N & C Maluku to the Solomon Islands, including Australia.

Foodplants.— *Calliandra, Wagatea* (Fabaceae); *Macadamia* (Proteaceae); *Alectryon*, *Cupaniopsis, Heterodendron* (Sapindaceae); *Theobroma* (Sterculiaceae; Fujii, 1987); *Aphananthe* (Ulmaceae; Braby, 2000).

— **N. berenice eliana* Fruhstorfer, 1916

Range.— Sulawesi, Kep. Banggai (Peleng), Kep. Sula.

— *N. berenice zyrthis* Fruhstorfer, 1916

Range.— Java, Lesser Sunda Islands east to Banda, Tanahjampea, Kalao.

N. normani Eliot, 1969

(Norman's Lineblue)

Range (7).— Borneo, Sulawesi.

Foodplants.— *Bauhinia* (Fabaceae); *Paranephelium* (Sapindaceae); *Theobroma* (Sterculiaceae) (Pan & Morishita, 1990).

— **N. normani titei* Eliot, 1969

Range.— Sulawesi (N, C, S).

N. kurava Moore, 1858

(Transparent 6-lineblue)

Range (1+2+4+5+6+7).— Widespread throughout Oriental and Australian Regions, including Palawan and Mindanao (Philippines) and C Maluku.

Foodplants.— Dipterocarpaceae; *Pueraria* (Fabaceae); *Aegiceras*, *Ardisia, Embelia, Maesa, Myrsine, Rapanea* (Myrsinaceae); *Lysimachia* (Primulaceae); *Cupaniopis*, *Nephelium* (Sapindaceae). Igarashi & Fukuda (1997) illustrate larva and pupa.

— **N. kurava menyangka* Takanami, 1990

Range.— Sulawesi (N, C, S), Kep. Talaud, Kep. Banggai (Peleng), Kep. Sula (Sanana).

Cassidy (1990) argues that the geographical distribution of phenotypes precludes division of *N. kurava* into subspecies in the Sundaland-Philippines-Sulawesi part of the species' range, and includes Sulawesi material in the nominotypical subspecies (type locality Java). However, we here tentatively accept the taxon introduced by Takanami (1990), described from C and S Sulawesi, for the Sulawesi Region.

N. beroe Felder & Felder, 1865
(Opaque 6-lineblue)

Range (1+2+5+6+7).— Widespread in Oriental Region, Malay Peninsula, Sumatra, Java, Bali, Sumba (Seki *et al*., 1991), Borneo, Palawan, Philippines (Treadaway, 1995), Sulawesi, Kalao.

Foodplants.— Fabaceae.

— **N. beroe hayashii* Takanami, 1990

Range.— Sulawesi (N, C, S), Kalao (Cassidy, 1990).

N. calauria Felder, 1860
(Dark Ceylon 6-lineblue)

Range (P).— Sri Lanka, India (Hirowatari, 1992), Malay Peninsula, Sumatra, Java, Sumbawa, Flores (Takanami, 1986a), Borneo, ?Philippines (not included by Treadaway, 1995), Kep. Sula (Cassidy, 1990), Maluku, New Guinea, New Britain (Seki *et al*., 1991).

— *N. calauria calauria* Felder, 1860

Range.— Kep. Sula, N & C Maluku, New Guinea, ?New Britain.

***Psychonotis* Toxopeus, 1930**
(green-banded blues — Pl. 8, fig. 12)

Range (3+4).— A genus of nine species (Hirowatari, 1992), most richly represented in the Papuan Region but extending into Australia, Maluku and Sulawesi.

Foodplants.— Rhamnaceae (*Alphitonia*).

Key works.— d'Abrera (1977), Common & Waterhouse (1981), Hirowatari (1992).

**P. piepersii* Snellen, 1878
(Pl. 8, fig. 12)

Range (E).— Sulawesi, Kep. Banggai (Peleng), Kep. Sula (Sanana).

***Prosotas* H.H. Druce, 1891**
(lineblues — Pl. 8, fig. 6)

Range (W).— Oriental and Australian Regions. One third of the 18 or so known species are found in the Sulawesi Region.

Foodplants.— Combretaceae, Fabaceae, Myrtaceae, Proteaceae, Sapindaceae; sometimes ant attended.

Key works.— Tite (1963), Corbet & Pendlebury (1992), Common & Waterhouse (1981), d'Abrera (1986), Hirowatari (1992).

P. aluta H. Druce, 1873
(Banded Lineblue)

Range (1+2+5+6+7).— Sikkim, Assam, Thailand, Malay Peninsula, Sumatra, Java, Sumbawa, Dammar (Seki *et al*., 1991), Borneo, Palawan, Philippines, Sulawesi Region.

Foodplant.— *Dalbergia* (Veenakumari et al., 1998); gen. indet. (Fiedler, pers. obs. in Sabah, Borneo) (Fabaceae) – facultatively attended by ants (*Anoplolepis*).

— **P. aluta alutina* Fruhstorfer, 1916

Range.— Sulawesi (N), Kep. Banggai (Peleng). Cassidy (1990) reports that this butterfly was not rediscovered during the 1985 *Project Wallace* expedition to N Sulawesi.

P. nora Felder, 1860

(Common Lineblue — Pl. 8, fig. 6)

Range (1+2+4+5+6+7).— Sri Lanka, India, Burma, Taiwan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands (Takanami, 1986a), Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Solomon Islands, northern Australia.

Foodplants.— Combretaceae (Wynter Blyth, 1982); *Acacia, Mimosa, Pithecellobium* (Fabaceae); Myrtaceae; *Allophylus* (Sapindaceae).

— *P. nora nora* Felder, 1860

Range.— Sulawesi (N, C, S), Kep. Sangihe, Kep. Talaud, Kep. Banggai (Peleng), Kep. Sula (Sanana, Mangole), C Maluku, New Guinea, Bismarcks.

P. pia Toxopeus, 1929

(Margined Lineblue)

Range (4+6+7).— India, Nepal, Assam, Burma, Indo-China, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Sulawesi, C Maluku (Seram).

— **P. pia elioti* Tite, 1963

Range.— Sulawesi (C, S).

**P. ella* Toxopeus, 1930

Range (E).— Sulawesi (N, C). Cassidy (1990) records a male from Dumoga-Bone National Park.

P. gracilis Röber, 1886

Range (1+2+3+4+6+7).— India, Burma, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines (Luzon, Mindanao: Treadaway, 1995), Sulawesi, N & C Maluku, New Guinea region.

— *P. gracilis gracilis* Röber, 1886.

Range.— Sulawesi (N, C: Cassidy, 1990), northern and central Maluku (Obi, Seram), New Guinea region.

P. dubiosa Semper, 1879

(Small Purple Lineblue, or Tailless Lineblue)

Range (1+2+5+6+7).— Widespread in Oriental and Australian Regions, from Sri Lanka to Queensland and Solomon Islands, including Palawan and the Philippines proper (Treadaway, 1995). Presence in Maluku uncertain.

Foodplants.— *Acacia, Archidendron*, *Cajanus, Dalbergia* (Fabaceae); *Macadamia* (Proteaceae); *Litchi* (Sapindaceae); attended by ants (e.g. *Anoplolepis*) on a weak or casual basis (Cassidy, 1990; Fiedler, 1996b; Braby, 2000). Igarashi & Fukuda (1997) illustrate larva and pupa.

— **P. dubiosa subardates* Piepers & Snellen, 1918

Range.— Sulawesi (Takanami, 1987; Cassidy, 1990), Kep. Sangihe, Kep. Talaud, Tanahjampea, Kalao (Cassidy, 1990).

Nothodanis Hirowatari, 1992
(Pl. 8, fig. 13)

Range (1+2+3+7).— A recently erected monobasic genus occurring from Indo-China, north Borneo, Palawan, Philippines, Sulawesi Region, N Maluku, New Guinea region to the Solomon Islands, Vanuatu and New Caledonia. Previously included in *Danis* Fabricius, 1807.

Foodplants.— Connaraceae (*Connarus*).

Key works.— d'Abrera (1977), Hirowatari (1992).

N. schaeffera Erschoff, 1821
(Pl. 8, fig. 13)

Range (1+2+3+7).— As genus.

— *N. schaeffera schaeffera* Erschoff, 1821

Range.— Northern Borneo, Palawan, Philippines, Kep. Talaud, Sulawesi, Kep. Togian (Seki *et al.*, 1991).

Foodplants.— As genus.

Catopyrops Toxopeus, 1929
(lineblues — Pl. 8, fig. 8)

Range (1+2+4+5+6+7).— Oriental and Australian Regions, from India to the Solomon Islands. Eight species, two of which occur in Sulawesi.

Foodplants.— Euphorbiaceae, Fabaceae, Sapindaceae (*Alectryon, Cupaniopsis*), Ulmaceae (*Trema*), Urticaceae; attended by ants.

Key works.— Tite (1963), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Parsons (1986), Hirowatari (1992).

C. ancyra Felder, 1860
(Felder's Lineblue — Pl. 8, fig. 8)

Range (1+2+4+5+6+7).— Assam, Burma, Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, C Maluku (Ambon, ?Seram), New Guinea region, Torres Strait, Solomon Islands, Fiji (Hirowatari, 1992).

Foodplants.— *Glochidion* (Euphorbiaceae); *Caesalpinia* (Fabaceae); *Pipturus* (Urticaceae) (Parsons 1991; Braby, 2000).

— **C. ancyra subfestivus* Röber, 1886

Range.— Sulawesi (N, C, S), Kep. Talaud, Kep. Sangihe (Sangihe, Siao), Kep. Tukangbesi, Kep. Banggai (Peleng; Nieuwenhuis, 1946), Kep. Sula (Mangole, Sanana).

C. rita Grose Smith, 1895

Range (5+6).— Java, Lesser Sunda Islands, Sulawesi (S), Tanahjampea.

— **C. rita bora* Eliot, 1956

Range.— Sulawesi (C, S: Cassidy, 1990).

— *C. rita altijavana* Toxopeus, 1930

Range.— Java, Tanahjampea.

Ionolyce Toxopeus, 1929
(lineblues — Pl. 8, fig. 7)

Range (1+2+4+5+6+7).— Oriental and Australian Regions, from Sri Lanka to Solomon Islands and Vanuatu. Three species, two of which are restricted to the Solomon Islands and Bougainville.

Key works.— Tite (1963), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Hirowatari (1992), Tennent (2002), Parsons (1999).

I. helicon Felder, 1860
(Pointed Lineblue — Pl. 8, fig. 7)

Range (1+2+4+5+6+7).— Sri Lanka to Australia and New Guinea region, including Palawan and the Philippines.

— **I. helicon helicon* Felder, 1860

Range.— Sulawesi (N, C, S), Kep. Talaud, Kep. Banggai (Peleng), Kep. Sula (Sanana), C Maluku.

Caleta Fruhstorfer, 1922
(pierrots — Pl. 8, figs 10, 11)

Range (1+2+4+5+6+7).— Oriental Region, C. Maluku, eastwards to New Guinea. Three of the nine species occur on Sulawesi.

Foodplants.— Rhamnaceae; not attended by ants (Fiedler, 1994b, 1996b).

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992), Takanami (1989), Hirowatari (1992).

C. caleta Hewitson, 1876
(Angled Pierrot — Pl. 8, figs 10, 11)

Range (2).— Southern Philippines (including Sulu Archipelago: Treadaway, 1995), Sulawesi, Kep. Banggai.

Note.— Hirowatari (1992) considers *argola* Hewitson, from southern Philippines, to be a distinct but sister species of *caleta*, but Treadaway (1995) continues to treat *argola* as a subspecies.

Foodplants.— *Ziziphus* (Rhamnaceae).

— **C. caleta caleta* Hewitson, 1876

Range.— Sulawesi (N, C).

— **C. caleta kalawara* Ribbe, 1926

Range.— Sulawesi (C).

Note.— Takanami (1989) suggests that this taxon is probably a synonym of *caleta caleta*.

— **C. caleta* subsp. (Detani, 1983)

Range.— Kep. Banggai (Peleng).

C. rhode Hopffer, 1874

Range (4+5).— Lesser Sunda Islands, Sulawesi Region, Maluku (Buru).

— **C. rhode rhode* Hopffer, 1874

Range.— Sulawesi (N, C), Kep. Banggai (Peleng; Nieuwenhuis, 1946).

— *C. rhode rhodana* Fruhstorfer, 1918

Range.— Sulawesi (S), Kalao, Kep. Sula (Sula Mangole).

— *C. rhode* subsp. (BMNH)

Range.— Kep. Talaud.

C. celebensis Staudinger, 1889.

Range (E).— Sulawesi (C, S).

Discolampa Toxopeus, 1929

(pierrots — Pl. 8, fig. 9)

Range (W).— Oriental, extending to the Papuan Region. A small genus of three species (Hirowatari, 1992), two occurring on Sulawesi.

Foodplants.— Rhamnaceae; attended by ants (Fiedler, 1996b).

Key works.— d'Abrera (1977, 1986), Corbet & Pendlebury (1992), Hirowatari (1992).

D. ethion Westwood, 1851

(Banded Blue Pierrot)

Range (W).— Sri Lanka, India, Burma, Indo-China, south China, Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, Maluku (no details; Hirowatari, 1992).

Foodplants.— *Ziziphus* (Rhamnaceae). Koiwaya & Wakahara (1999) illustrate the pupa.

— **D. ethion ulyssides* Grose Smith, 1895

Range.— Sulawesi (S).

D. ilissus Felder, 1859

(Pl. 8, fig. 9)

Range (3+4).— Sulawesi, Kep. Banggai, northern and central Maluku (Buru).

— **D. ilissus ilissus* Felder, 1859

Range.— Sulawesi, Kep. Banggai (Peleng).

Jamides Hübner, 1819

(caeruleans — Pl. 8, fig. 14)

Range (W).— Oriental, Australian and Pacific Regions. An extensive genus of some 60 species (Hirowatari, 1992, lists 57). About 20 members of this beautiful but complex group are found in the Sulawesi Region; others may await discovery.

Foodplants.— Euphorbiaceae, Fabaceae, Marantaceae, Meliaceae, Myrtaceae, Rutaceae, Sapindaceae, Sterculiaceae, Zingiberaceae; facultatively attended by ants (Seufert & Fiedler, 1996b).

Key works.— Riley & Corbet (1938), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Hirowatari (1986a, 1992), Takanami (1989), Hirowatari & Cassidy (1994).

J. bochus Stoll, 1782
(Dark Caerulean)

Range (W).— Widespread in Oriental, Australian and Pacific Regions from Sri Lanka to Fiji, including Lesser Sunda Islands, Palawan, Philippines, N & C Maluku and New Guinea region (Parsons, 1999), but not found in Australia.

Foodplants.— *Butea, Caesalpinia*, *Cajanus*, *Canavalia, Crotalaria, Derris, Flemingia, Millettia, Phaseolus, Pongamia, Pueraria, Tephrosia, Vigna, Xylia* (Fabaceae); *Citrus* (Rutaceae). Igarashi & Fukuda (1997) illustrate all life stages.

— **J. bochus phaidon* Fruhstorfer, 1915

Range.— Sulawesi, Kep. Talaud, Kep. Banggai (Peleng).

J. seminiger Grose Smith, 1895

Range (P).— N Maluku, Kep. Sula.

— **J. seminiger tiglath* Fruhstorfer, 1915

Range.— Kep. Sula (Mangole).

**J. biru* Ribbe, 1926

Range (L).— Kep. Banggai.

Note.— This species is not listed by Hirowatari (1992).

J. cyta Boisduval, 1832
(Pale Caerulean)

Range (1+2+3+5+6+7).— Burma, Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N Maluku, New Guinea region, northern Australia.

Foodplants.— *Eugenia* (Kirton & Kirton, 1987); *Syzygium* (Braby, 2000) (Myrtaceae); *Elettaria, Kaempferia* (Zingiberaceae).

— **J. cyta zelia* Fruhstorfer, 1916

Range.— Sulawesi (S), Kep. Banggai (Peleng).

— *J. cyta hellada* Fruhstorfer, 1916

Range.— Kep. Sula (Mangole, Sanana).

**J. snelleni* Röber, 1886 (= *ohtai* Hayashi)
(Snellen's Caerulean)

Range (E).— Sulawesi (S).

J. celeno Cramer, 1775
(Common Caerulean)

Range (W).— Widespread in Oriental and Australian Regions, from Sri Lanka to Vanuatu, including Lesser Sunda Islands, Palawan, Philippines, N & C Maluku, New Guinea region, Solomon Islands, Vanuatu, but not found in Australia.

Foodplants.— *Abrus, Butea, Calopogonium, Canavalia, Delonix, Derris, Dolichos, Dysolobium, Mucuna, Pongamia, Pueraria, Saraca, Vigna, Xylia* (Fabaceae); *Donax* (Marantaceae); *Heynea, Melia, Trichilia* (Meliaceae); *Theobroma* (Sterculiaceae); *Elettaria* (Zingiberaceae); attended by various ant genera (Seufert & Fiedler, 1996b). The early stages are illustrated by Igarashi & Fukuda (2000).

— *J. celeno optimus* Röber, 1886
Range.— Philippines, Kep. Talaud, Sulawesi, Kep. Tukangbesi, Kep. Banggai (Peleng).
— **J. celeno kalawarus* Ribbe, 1926
Range.— Sulawesi (C: Palu district: see Takanami, 1989).
— **J. celeno* subsp. (BMNH)
Range.— Kep. Sula (Mangole, Sanana).

**J. tsukadai* Takanami, 1994
Range (E).— Sulawesi (C).

**J. fractilinea* Tite, 1960
Range (R).— Sulawesi, Kep. Sula (Mangole).

J. aratus Stoll, 1781
(Pl. 8, fig. 14)
Range (1+3+4+5+6+7).— Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Sibutu (Treadaway, 1995), Palawan, Balabac, Sulawesi Region, N & C Maluku.
Note.— See Hirowatari (1992) regarding separation of *aratus* from the more eastern *aetherialis* Butler.
— **J. aratus lunata* de Nicéville, 1899
Range.— Sulawesi, Kep. Sangihe, Kep. Banggai (Peleng).
— **J. aratus makitai* Takanami, 1987
Range.— Kep. Talaud.
— **J. aratus* subsp. (BMNH)
Range.— Salayar.
— **J. aratus djampeana* Snellen, 1890
Range.— Tanahjampea.
— **J. aratus* subsp. (BMNH)
Range.— Kep. Tukangbesi (Kaledupa, Binongko).
— **J. aratus minthe* Fruhstorfer, 1916
Range.— Kep. Sula (Mangole, Sanana).

J. cleodus Felder & Felder, 1865
Range (1+2+7).— Northern Borneo, Palawan, Philippines, Sulawesi Region.
Note.— Seki *et al*. (1991) and Hirowatari (1992) do not record this species for Sulawesi or Borneo.
— **J. cleodus* subsp. (= *lydanus* Fruhstorfer, 1916: homonym)
Range.— Sulawesi (N), Kep. Banggai (Peleng; Nieuwenhuis, 1946).

J. philatus Snellen, 1878
(Burmese Caerulean)
Range (1+2+3+4+6+7).— India (Hirowatari, 1992), Burma, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea.

— **J. philatus philatus* Snellen, 1878
Range.— Sulawesi, Kep. Banggai (Peleng), Kep. Sula (Sanana).

**J. elioti* Hirowatari & Cassidy, 1994
(Eliot's Caerulean)
Range (E).— Sulawesi (N, C).

**J. festivus* Röber, 1886
Range (R).— Sulawesi, Kep. Banggai.
— **J. festivus festivus* Röber, 1886
Range.— Sulawesi.
— **J. festivus bangkaia* Ribbe, 1926
Range.— Kep. Banggai.

J. alecto Felder, 1860
(Metallic Caerulean)
Range (W).— Sri Lanka, India, south China, Taiwan, Indo-China (Hirowatari, 1992), Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea (Waigeo, Irian Jaya: BMNH).

Foodplants.— *Hevea* (Euphorbiaceae); *Pueraria* (Fabaceae); *Alpinia*, *Boesenbergia*, *Curcuma, Elettaria, Hedychium, Kaempferia, Zingiber* (Zingiberaceae). Larvae facultatively attended by a variety of ant genera (*Pheidole, Crematohgaster, Tetramorium, Rhoptromyrmex, Myrmicaria, Tapinoma, Technomyrmex, Anoplolepis* and more). Igarashi & Fukuda (1997) illustrate all life stages.
— **J. alecto* subsp. (BMNH)
Range.— Sulawesi (N).
— **J. alecto luniger* Toxopeus, 1930
Range.— Sulawesi (C).
— **J. alecto latimargus* Snellen, 1878
Range.— Sulawesi (S).

Note.— Hirowatari (1992) lists *latimargus* (currently ambiguous) as a distinct species, endemic to Sulawesi, but also lists the widespread *alecto* as present on the island.
— **J. alecto alvenus* Fruhstorfer, 1916
Range.— Salayar.

**J. halus* Takanami, 1994
Range (E).— Sulawesi (C, S).

J. pseudosias Rothschild, 1915
Range (3).— ?Borneo (Parsons, 1999; not listed by Seki *et al.*, 1991, or Hirowatari, 1992), Sulawesi, N Maluku (including Obi), New Guinea region including New Ireland.
— **J. pseudosias echeilea* Fruhstorfer, 1916
Range.— Sulawesi.

**J.* species (BMNH)

Range (L).— Kep. Sula.

Note.— The identity of this material is uncertain.

J. schatzi Röber, 1886

Range (1+2+3).— Palawan, Philippines (Treadaway, 1995), Sulawesi Region, N Maluku (including Obi).

— **J. s. argentiferus* Fruhstorfer, 1916

Range.— Sulawesi (N), Kep. Banggai (Peleng: Detani, 1983).

— **J. s. demetrias* Fruhstorfer, 1916

Range.— Kep. Talaud, Kep. Sangihe (Sangihe, Siao), ?Kep. Sula.

J. elpis Godart, 1824

Range (W).— Sikkim, Assam, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, Timor.

Note.— *J. elpis* is not listed by Seki *et al*. (1991) for Sulawesi Region or Maluku.

Foodplants.— Sapindaceae (*Lepisanthes*: Fiedler, unpubl., in West Malaysia); *Boesenbergia, Elettaria* (Zingiberaceae).

— **J. elpis espada* Fruhstorfer, 1916

Range.— Sulawesi (N).

— **J. elpis comeda* Fruhstorfer, 1916

Range.— Tanahjampea.

**J. celebica* Eliot, 1969

Range (E).— Sulawesi (N, C).

***Catochrysops* Boisduval, 1832**

(forget-me-nots — Pl. 8, fig. 15)

Range (W).— Sri Lanka, India, and through the Malay Archipelago (including Lesser Sunda Islands, Borneo, Philippines and Maluku) to Australia, New Caledonia and Society Islands. A genus of six species, well represented on Sulawesi.

Foodplants.— Fabaceae, Sapindaceae; attended by ants.

Key works.— Tite (1959), Corbet & Pendlebury (1992), Common & Waterhouse (1981), Hirowatari (1992).

C. strabo Fabricius, 1793

(Forget-me-not)

Range (W).— Oriental and Australian Regions from Sri Lanka to Louisiade Archipelago, including Lesser Sunda Islands, Palawan, Philippines and N & C Maluku.

Foodplants.— *Abrus, Acacia, Butea, Cajanus, Cylista, Desmodium, Dolichos, Dunbaria, Lablab, Phaseolus, Phyllodium, Pisum, Vigna* (Fabaceae); *Schleichera* (Wynter Blyth, 1982) (Sapindaceae).

— *C. strabo celebensis* Tite, 1959

Range.— Sulawesi, Kep. Tukangbesi, Kalao, Buton, Kep. Sula, Maluku.

— *C. strabo luzonensis* Tite, 1959

Range.— Palawan, Philippines, Kep. Talaud, Kep. Sangihe.

C. strabobinna Swinhoe, 1916
(Pl. 8, fig. 15)

Range (3+4+5).— Lesser Sunda Islands (including Bali), Sulawesi, Kep. Talaud, Kep. Tukangbesi, Kep. Sula (Sula Mangole), N & C Maluku.

Note.— Hirowatari (1992) gives only Maluku.

C. panormus Felder, 1860
(Silver Forget-me-not)

Range (W).— As genus (limited known range in Philippines: see Treadaway, 1995).

Foodplants.— *Caesalpinia*, *Cajanus, Crotalaria, Dendrolobium, Dolichos, Flemingia, Phaseolus* (Fabaceae).

— **C. panormus* subsp. (BMNH)

Range.— Sulawesi.

***Lampides* Hübner, 1819**
(peablues — Pl. 8, fig. 16)

Range (W).— A monobasic genus distributed throughout Africa and the Indo-Australian Region, and extending to southern Europe and Hawaii.

Foodplants.— Mainly buds and pods of many legumes (Fabaceae), including *Butea*, *Cajanus, Canavalia, Chamaecytisus, Clianthus, Crotalaria, Cullen, Dolichos, Dunbaria, Glycine, Gompholobium, Kennedia, Lablab, Lathyrus, Lespedeza, Lotus, Lupinus, Medicago, Melilotus, Millettia, Phaseolus, Pisum, Psophocarpus, Psoralea, Pueraria, Pultenaea, Sesbania, Swainsona, Vicia, Vigna, Virgilia*; additionally on *Tecoma* (Pelzer, 1991) (Bignoniaceae); *Capparis* (Jordano *et al.*, 1988 in Spain, during drought) (Capparidaceae); *Macaranga* (Euphorbiaceae) and *Lilium* (Liliaceae); attended facultatively by a variety of ants (Fiedler, in Hesselbarth *et al.*, 1995).

Key works.— Corbet & Pendlebury (1992), Common & Waterhouse (1981), Hirowatari (1992).

L. boeticus Linnaeus, 1767
(Long-tailed Blue, or Peablue — Pl. 8, fig. 16)

Range (W).— As genus, including Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, Kep. Talaud, Kep. Banggai (Peleng), Galla and N & C Maluku.

Foodplants.— As genus.

***Castalius* Hübner, 1819**
(Pl. 8, figs 18, 19)

Range (2+5+6+7).— Sri Lanka, India, southern China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Luzon, Samar: Treadaway, 1995), Sulawesi Region. Four species, all of which occur on Sulawesi.

Note.— Takanami (1989) places these species in the genus *Tarucus* Moore, 1881,

otherwise known from the Afrotropical Region and the Indian subregion, but Evans (1955) specifically excluded the Sulawesi Region species; Larsen (1982) regards *Castalius* (type species: *Papilio rosimon* Fabricius) as strictly monobasic; Hirowatari (pers. comm. to J. N. Eliot) considers that the three additional Sulawesi taxa listed here belong to *Castalius*, but Hirowatari (1992) gives only two species for the genus, *rosimon* and *fasciatus*. Thus, the species *clathratus* and *fluvialis* may be newly combined here in *Castalius*, and it is clear that this group is in need of formal revision.

Foodplants.— Rhamnaceae.

Key works.— Larsen (1982), Corbet & Pendlebury (1992), Hirowatari (1992).

C. rosimon Fabricius, 1775
(Common Pierrot)

Range (2+5+6+7).— As genus, except restricted to Sulawesi in Sulawesi Region.

Foodplants.— *Paliurus* (Bascombe *et al.*, 1999), *Ziziphus* (Rhamnaceae). Igarashi & Fukuda (2000) illustrate the foodplant and early stages.

— **C. rosimon silas* Fruhstorfer, 1922

Range.— Sulawesi (S).

**C. fasciatus* Röber, 1887
(Pl. 8, figs 18, 19)

Range (R).— Sulawesi, Kep. Banggai.

— **C. fasciatus adorabilis* Fruhstorfer, 1918

Range.— Sulawesi (N).

— **C. fasciatus fasciatus* Röber, 1887

Range.— Kep. Banggai (Peleng).

**C. clathratus* Holland, 1891

Range (E).— Sulawesi (S).

**C. fluvialis* Grose Smith, 1895

Range (E).— Sulawesi (S).

***Famegana* Eliot, 1973**
(grass blues — Pl. 8, fig. 22)

Range (5).— Southern China, Hainan, Taiwan, Lesser Sunda Islands, Philippines (Luzon: Treadaway, 1995), Sulawesi, New Guinea region, Vanuatu, Fiji, Samoa, Tonga, Australia (monobasic).

Foodplants.— Buds and flowers of Fabaceae; Zygophyllaceae; attended by ants.

Key works.— Common & Waterhouse (1981), Hirowatari (1992), Parsons (1999).

F. alsulus Herrich-Schäffer, 1869
(Black-spotted Grass Blue — Pl. 8, fig. 22)

Range (5).— As genus.

Foodplants.— *Cajanus*, *Desmodium, Flemingia, Indigofera*, *Moghamia, Phyllodium* (Fabaceae); additionally recorded from Zygophyllaceae (Shen-Horn Yen *in litt*., from Taiwan).

— **F. alsulus kalawarus* Ribbe, 1926
Range.— Sulawesi.

Pithecops Horsfield, 1828
(quakers — Pl. 8, fig. 25)

Range (W).— Oriental Region to New Guinea region, Solomon Islands and northern tip of Cape York. A small genus of five species (Hirowatari, 1992), two of which occur in the Sulawesi Region.

Foodplants.— Fabaceae, Rubiaceae, Rutaceae.

Key works.— Cowan (1966a), Corbet & Pendlebury (1992), Hirowatari (1992).

P. corvus Fruhstorfer, 1919
(Forest Quaker)

Range (P).— India, Burma (Hirowatari, 1992), Indo-China, Taiwan, Ryukyu Islands, Thailand, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Palawan, Philippines, Kep. Talaud.

Foodplants.— *Desmodium* (Fabaceae); *Gardenia* (Rubiaceae); *Glycosmis* (Rutaceae). Igarashi & Fukuda (2000) illustrate one of the foodplants and the early stages.

— *P. corvus corax* Fruhstorfer, 1917
Range.— Java, western Lesser Sunda Islands, Borneo, Philippines, Kep. Talaud.
Note.— Seki *et al*. (1991) treat *corax* as a synonym of *corvus corvus*.

**P. phoenix* Röber, 1886
(Sulawesi Quaker — Pl. 8, fig. 25)

Range (R).— Sulawesi, Kep. Talaud, Kep. Sangihe, Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana).

Note.— Takanami (1989) considers *moeros* Staudinger, 1888, from northern Sulawesi to be a good subspecies of *P. phoenix*.

Leptotes Scudder, 1876 (= *Syntarucus* Butler, 1900)
(zebra blues — Pl. 8, fig. 17)

Range (2+3+4+5+6+7).— Palaearctic, Afrotropical, Oriental and Australian Regions. Best developed in Africa, the genus is only represented in the Indo-Australian region by a single polytypic species (not so far recorded from Malay Penisnula or Palawan: Corbet & Pendlebury, 1992; Treadaway, 1995).

Foodplants.— Fabaceae, Fagaceae, Plumbaginaceae, Rhamnaceae, Rosaceae; attended by ants (Fiedler, in Hesselbarth *et al*., 1995).

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

L. plinius Fabricius, 1793
(Zebra Blue, Plumbago Blue — Pl. 8, fig. 17)

Range (2+3+4+5+6+7).— Sri Lanka, India, Indo-China, Sumatra, Java, Lesser Sunda Islands, Taiwan, Borneo (one male: Seki *et al*., 1991), Philippines (Luzon, Leyte, Mindanao: Treadaway, 1995), Sulawesi Region, N & C Maluku, New Guinea region, Australia, Vanuatu, New Caledonia.

Foodplants.— *Albizia, Dolichos, Galactia, Galscutia, Glycine, Indigofera, Lablab, Mimosa, Rhynchosia, Sesbania, Tephrosia* (Fabaceae); *Dyerophytum*, *Plumbago* (Plumbaginaceae); *Ziziphus* (Rhamnaceae); sometimes attended by ants. Igarashi & Fukuda (1997) illustrate all life stages.

— **L. plinius plutarchus* Fruhstorfer, 1922

Range.— Sulawesi (N, S), Kep. Talaud, Kep. Sangihe, Kep. Sula (Mangole).

— **L. plinius celis* Fruhstorfer, 1922

Range.— Sulawesi (C).

— **L. plinius zingis* Fruhstorfer, 1922

Range.— Buton.

Zizeeria Chapman, 1910

(grass blues — Pl. 8, fig. 20)

Range (W).— Palaeotropics, southern and eastern Palaearctic. A genus of two allopatric species.

Foodplants.— Aizoaceae, Amaranthaceae, Chenopodiaceae, Euphorbiaceae, Fabaceae, Molluginaceae, Oxalidaceae, Polygonaceae, Zygophyllaceae; attended by ants (Fiedler & Hagemann, 1995).

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

Z. karsandra Moore, 1865

(Dark Grass Blue — Pl. 8, fig. 20)

Range (W).— From Algeria and northern Arabia, eastwards throughout the Oriental Region to Australia, including the Lesser Sunda Islands, Palawan, Philippines, Moluccas (Seki *et al.*, 1991), New Guinea (Parsons, 1999).

Foodplants.— *Glinus* (Aizoaceae); *Amaranthus* (Amaranthaceae); *Glycine, Medicago, Zornia* (Fabaceae); *Oxalis* (Oxalidaceae); Polygonaceae; *Tribulus* (Zygophyllaceae); associated facultatively with ants (*Tapinoma*: Fiedler, in Hesselbarth *et al*., 1995).

— *Z. karsandra karsandra* Moore, 1865

Range.— As for species, including Lesser Sunda Islands, Sulawesi (S), Kep. Tukangbesi and Maluku (no details), but not Australia.

Zizina Chapman, 1910

(lesser grass blues — Pl. 8, fig. 21)

Range (W).— Palaeotropics. Three allopatric species, one confined to Africa and peninsular India, and another to the Australian Region and the Pacific.

Foodplants.— Fabaceae, Zygophyllaceae; attended by ants.

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

Z. otis Fabricius, 1787

(Lesser Grass Blue — Pl. 8, fig. 21)

Range (W).— Indo-China to Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands (Takanami, 1986a), Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Alysicarpus, Cullen, Daviesea, Desmodium, Hardenbergia, Indigofera, Lotus, Mimosa, Pultenaea, Sesbania, Swainsona, Trifolium, Trigonella, Vandellia, Vigna, Zornia* (Fabaceae); in Australia also on a number of introduced Fabaceae including: *Glycine*, *Lupinus*, *Macroptilium*, *Medicago*, *Phaseolus*, *Pisum*, *Trifolium*, *Vicia*, *Virgilia* (Braby, 2000); *Tribulus* (Zygophyllaceae).

— **Z. otis* subsp. (BMNH)

Range.— Sulawesi, Salayar.

— **Z. otis* subsp. (Detani, 1983)

Range.— Kep. Banggai (Peleng).

— *Z. otis tanagra* Felder, 1860

Range.— Kep. Tukangbesi, Kep. Sula (Sanana), N & C Maluku.

Zizula Chapman, 1910

(tiny grass blues — Pl. 8, fig. 23)

Range (W).— Pantropical. Two allopatric species, one confined to the Americas.

Foodplants.— Acanthaceae, Fabaceae, Oxalidaceae, Verbenaceae, Zygophyllaceae; attended by ants.

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

Z. hylax Fabricius, 1775

(Tiny Grass Blue — Pl. 8, fig. 23)

Range (W).— Afrotropical, Oriental and Australian Regions, including Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Solomon Islands, Vanuatu, New Caledonia.

Note.— Larsen (in press) is of the view that division of *hylax* into subspecies is not really practicable.

Foodplants.— *Belopeone, Dicliptera, Dipteracanthus, Blechum, Hygrophila, Nelsonia, Phaulopsis, Ruellia* (Australia, introduced; Braby 2000), *Strobilanthes* (Acanthaceae; other genera in Africa); *Desmodium, Mimosa, Vicia* (Fabaceae); *Oxalis* (Oxalidaceae); *Lantana* (Verbenaceae); Zygophyllaceae. Igarashi & Fukuda (2000) illustrate the larva and pupa.

— *Z. hylax hylax* Fabricius, 1775

Range.— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, Kep. Talaud, Kep. Tukangbesi, Kep. Banggai (Peleng), Kep. Sula (Sanana), N & C Maluku, New Guinea, Guam, Fiji, Loyalty Islands.

Everes Hübner, 1819

(cupids, tailed or short-tailed blues — Pl. 8, fig. 24)

Range (W).— Primarily found in the Holarctic and Sino-Himalayan regions, with about half a dozen species; one member extends throughout the Oriental Region east to Australia.

Foodplants.— Crassulaceae, Fabaceae, Gesneriaceae. Facultatively attended by ants.

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

E. lacturnus Godart, 1824
(Tailed Cupid — Pl. 8, fig. 24)

Range (W).— Oriental Region east to Australia and the Solomon Islands, including Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines and N & C Maluku.

Foodplants.— *Desmodium, Lotus, Trifolium* (Fabaceae); *Lysionotus* (Gesneriaceae) (Shen-Horn Yen *in litt*., from Taiwan).

— **E. lacturnus* subsp. (BMNH)
Range.— Sulawesi.

— **E. lacturnus* subsp. (BMNH)
Range.— Kep. Talaud, Kep. Sangihe.

— **E. lacturnus* subsp. (Detani, 1983)
Range.— Kep. Banggai (Peleng).

— **E. lacturnus* subsp. (BMNH)
Range.— Kep. Sula (Sula Mangole).

***Neopithecops* Distant, 1884**
(quakers — not illustrated)

Range (P).— Sri Lanka to Taiwan, Malay Peninsula, Greater and Lesser Sunda Islands, Palawan, Philippines, Kep. Sula, northern Maluku (including Obi) and New Guinea region, just reaching northern Australia, but not recorded from Sulawesi. A small genus of five known species.

Foodplants.— Ebenaceae (*Diospyros*); Rutaceae (*Glycosmis*); sometimes attended by ants.

Key works.— Eliot & Kawazoé (1983), Cassidy (1995b).

N. sumbanus Eliot & Kawazoé, 1983
Range (P).— Lesser Sunda Islands, Tanahjampea.

— *N. sumbanus sumbanus* Eliot & Kawazoé, 1983
Range.— Sumba, Tanahjampea.

N. umbretta Grose Smith, 1895
Range (P).— Lesser Sunda Islands, Tanahjampea, Kep. Sula, N Maluku.

— **N. umbretta tituria* Fruhstorfer, 1919
Range.— Lesser Sunda Islands, Tanahjampea (Takanami, 1986a).

— **N. umbretta dorothea* Eliot & Kawazoé, 1983
Range.— Kep. Sula (Sanana).

***Megisba* Moore, 1881**
(malayans — Pl. 8, fig. 26)

Range (W).— Oriental and Australian Regions. Two allopatric species.

Foodplants.— Euphorbiaceae, Rhamnaceae, Sapindaceae.

Key works.— Common & Waterhouse (1981), Eliot & Kawazoé (1983), Corbet & Pendlebury (1992), Cassidy (1995b).

M. malaya Horsfield, 1828
(Malayan — Pl. 8, fig. 26)

Range (1+2+5+6+7).— Sri Lanka to Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Macaranga, Mallotus, Trigonostemon* (Euphorbiaceae); *Rhamnus* (Rhamnaceae); *Allophylus, Schmidella* (Sapindaceae).

— *M. malaya sikkima* Moore, 1884

Range.— Northern India to Taiwan and Ryukyu Islands, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi (N, C, S), Kep. Sangihe, Kep. Tukangbesi, Kep. Banggai (Peleng), Kep. Sula.

Cebrella Eliot & Kawazoé, 1983
(hedge blues — not illustrated)

Range (2+6+7).— Malay Peninsula, Bangka, Sumatra, Java, Borneo, Philippines (Mindanao, Panay) and Sulawesi. Six species divided into two subgenera; the subgenus found on Sulawesi has four members. *C. (Chelakina) matanga* Chapman, or a very closely related species, has been bred in Borneo from an aquatic larva found in pitcher plants (J. N. Eliot, pers. comm.).

Key works.— Eliot & Kawazoé (1983).

Cebrella (Chelakina) Eliot & Kawazoé, 1983

Range.— Bangka, Borneo and Sulawesi. Three described species are known from Borneo, one of which also occurs on Bangka; the Sulawesi species has yet to be described (and is not discussed by Cassidy, 1995b).

**C.* species nova (Eliot *in litt.*)

Range (E).— Sulawesi (C).

Sancterila Eliot & Kawazoé, 1983
(Pl. 8, fig. 27)

Range (4).— Sulawesi and central Maluku. Four species, three of which occur on Sulawesi; the fourth is known from Buru and Ambon.

Key works.— Eliot & Kawazoé (1983), Cassidy (1995b).

**S. deliciosa* Pagenstecher, 1896
(Pl. 8, fig. 27)

Range (E).— Sulawesi.

— **S. deliciosa deliciosa* Pagenstecher, 1896

Range.— Sulawesi (N).

— **S. deliciosa sohmai* Eliot & Kawazoé, 1983

Range.— Sulawesi (C: Cassidy, 1995b).

**S. russelli* Eliot & Kawazoé, 1983

Range (E).— Sulawesi (C).

**S. drakei* Cassidy, 1995

Range (E).— Sulawesi (C).

Udara Toxopeus, 1928

(hedge blues — Pl. 8, fig. 28)

Range (W).— Oriental and Australian Regions (including Australia), just extending into the eastern Palaearctic, and to Hawaii. About 40 species (Parsons, 1999), divided amongst three subgenera, one with eight species restricted to New Guinea, another monobasic and restricted to Hawaii.

Foodplants.— Aquifoliaceae, Caprifoliaceae, Fabaceae, Fagaceae, Rosaceae, Rubiaceae, Sapindaceae, Symplocaceae, Urticaceae.

Key works.— d'Abrera (1977), Eliot & Kawazoé (1983), Corbet & Pendlebury (1992), Cassidy (1995b).

Udara (Udara) Toxopeus, 1928

Range.— As genus, except Hawaii. About 20 species, six of which occur on Sulawesi.

U. dilecta Moore, 1879

(Pale Hedge Blue)

Range (2+4+5+6+7).— Himalayas and Indo-China to Japan, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, ?Palawan (not confirmed by Treadaway, 1995), Philippines, Sulawesi, C Maluku (Buru, Seram), New Guinea.

Foodplants.— *Castanopsis* (Fagaceae). Igarashi & Fukuda (2000) illustrate the larva and pupa.

— **U. dilecta thoria* Fruhstorfer, 1910

Range.— Sulawesi (N, C, S).

U. rona Grose Smith, 1894

Range (4+6).— Malay Peninsula, Sumatra, Java, Sulawesi, central Maluku, New Guinea, New Britain.

— *U. rona rona* Grose Smith, 1894

Range.— Sulawesi (N, C), C Maluku, New Guinea and New Britain.

U. placidula H.H. Druce, 1895

Range (W).— Assam, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, N & C Maluku.

— *U. placidula placidula* Druce, 1895

Range.— Borneo, Sulawesi (N, C).

U. camenae de Nicéville, 1895
(Pl. 8, fig. 28)

Range (2+4+7).— Malay Peninsula, Sumatra, Borneo, ?Palawan (not confirmed by Treadaway, 1995), Philippines, Sulawesi, C Maluku.

— **U. camenae euphon* Fruhstorfer, 1910
Range.— Sulawesi (N, C, S: Cassidy, 1995b).

**U. aristius* Fruhstorfer, 1910

Range (E).— Sulawesi.

— **U. aristius lewari* Ribbe, 1926.
Range.— Sulawesi (C).

— **U. aristius aristius* Fruhstorfer, 1910
Range.— Sulawesi (S).

**U. etsuzoi* Eliot & Kawazoé, 1983
Range (E).— Sulawesi (C).

***Sidima* Eliot & Kawazoé, 1983**
(not illustrated)

Range (2).— Sumatra, Mindanao, Sulawesi, New Guinea. Four allopatric species.
Key works.— Eliot & Kawazoé (1983), Cassidy (1995b).

**S. sulawesiana* Eliot & Kawazoé, 1983
Range (E).— Sulawesi (N).

***Acytolepis* Toxopeus, 1927**
(hedge blues — Pl. 8, fig. 29)

Range (1+2+5+6+7).— Oriental Region to southern Japan, Java, Lesser Sunda Islands, Borneo, Philippines, Sulawesi Region and ?Maluku. Five species, three of which occur on Sulawesi.

Foodplants.— Caprifoliaceae, Combretaceae, Cycadaceae, Dipterocarpaceae, Ericaceae, Euphorbiaceae, Fabaceae, Fagaceae, Hamamelidaceae, Malphigiaceae, Myricaceae, Rosaceae, Sapindaceae, Saxifragaceae, Ulmaceae; sometimes ant attended.

Key works.— Eliot & Kawazoé (1983), Corbet & Pendlebury (1992), Cassidy (1995b).

A. puspa Horsfield, 1828
(Common Hedge Blue)

Range (1+2+5+6+7).— Sri Lanka to Indo-China and Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, ?C Maluku.

Foodplants.— *Viburnum* (Caprifoliaceae); Combretaceae; Cycas (Cycadaceae); *Shorea* (Dipterocarpaceae); *Enkianthus, Lyonia, Rhododendron, Vaccinium* (Ericaceae); *Antidesma, Breynia, Bridelia, Glochidion* (Euphorbiaceae); *Calliandra, Cylista, Paracalyx, Pel-*

tophorum, Xylia (Fabaceae); *Quercus* (Fagaceae); *Distylum* (Hamamelidaceae); *Hiptage* (Malphigiaceae); *Myrica* (Myricaceae); *Aruncus, Chaenomeles, Malus, Photinia, Prunus, Rosa, Spiraea* (Rosaceae; several other genera in Japan); *Dimocarpus, Euphoria, Litchi, Sapindus, Schleichera* (Sapindaceae); *Astilbe* (Saxifragaceae); *Celtis* (Ulmaceae) (Fukuda *et al.*, 1992; Fiedler, unpubl.). Facultatively associated with ants (Fiedler, 1996b). Igarashi & Fukuda (2000) illustrate the early stages.

— **A. puspa kuehni* Röber, 1886
Range.— Sulawesi (N, C, S, E), Kep. Banggai.

— **A. puspa deronda* Fruhstorfer, 1922
Range.— ?Tondano (Cassidy, 1995b), Kep. Sula (Mangole, Sanana).

**A. najara* Fruhstorfer, 1910
Range (E).— Sulawesi (N, C, S: Cassidy, 1995b).

**A. samanga* Fruhstorfer, 1910
(Pl. 8, fig. 29)
Range (E).— Sulawesi (N, C, S: Cassidy, 1995b).

Celastrina Tutt, 1906
(holly blues, hedge blues — Pl. 8, fig. 30)

Range (W).— Holarctic and Oriental Regions, extending to Papuan Region. About 15 species, one of them (*C. argiolus*) being extremely widespread; two species occur in Sulawesi.

Foodplants.— Aceraceae, Anacardiaceae, Aquifoliaceae, Araliaceae, Asteraceae, Buddlejaceae,Caprifoliaceae, Celastraceae, Cornaceae, Ericaceae, Fabaceae, Fagaceae, Hamamelidaceae, Hippocastanaceae, Lamiaceae, Lythraceae, Moraceae, Oleaceae, Polygonaceae, Ranunculaceae, Rhamnaceae, Rosaceae, Rutaceae, Saxifragaceae, Staphyleaceae, Theaceae, Ulmaceae; sometimes ant-attended.

Key works.— Eliot & Kawazoé (1983), Corbet & Pendlebury (1992) Cassidy (1995b)

C. philippina Semper, 1889
(Philippine Hedge Blue — Pl. 8, fig. 30)

Range (1+2+3+4+5+7).— Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, eastern Lesser Sunda Islands, New Guinea region.

— **C. philippina gradeniga* Fruhstorfer, 1910
Range.— Sulawesi (N, E, S), Kep. Sula.

— *C. philippina philippina* Semper, 1889
Range.— Borneo, Palawan, Philippines, Kep. Talaud.

C. lavendularis Moore, 1877
(Plain Hedge Blue)

Range (2+3+4+5+6+7).— Sri Lanka to Indo-China and Taiwan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (see Treadaway, 1995), Sulawesi, N & C Maluku, New Guinea.

Foodplants.— *Millettia* (Fabaceae); *Acer* (Aceraceae); *Celtis* (Ulmaceae) (last two records from Shen-Horn Yen, for Taiwan); ant-attended.

— **C. lavendularis lyce* Grose Smith, 1896

Range.— Sulawesi (N, C).

****Uranobothria*** **Toxopeus, 1927**

(hedge blues — Pl. 8, fig. 31)

Range (E).— Sulawesi. An endemic genus of two species; according to Eliot & Kawazoé (1983), possibly related to the monobasic genus *Notarthrinus* from Assam and Burma.

Key works.— Eliot & Kawazoé (1983), Cassidy (1995b).

**U. celebica* Fruhstorfer, 1917

Range (E).— Sulawesi (S).

**U. tsukadai* Eliot & Kawazoé, 1983

(Tsukada's Hedge Blue — Pl. 8, fig. 31)

Range (E).— Sulawesi (N, C: Cassidy, 1995b).

Monodontides **Toxopeus, 1927**

(hedge blues — Pl. 8, fig. 32)

Range (1+2+3+5+6+7).— Oriental and Australian Regions (but not Australia, and not recorded from central Maluku). Two subgenera, one monobasic, the other with seven species, both represented on Sulawesi.

Key works.— Eliot & Kawazoé (1983), Corbet & Pendlebury (1992), Cassidy (1995b).

Monodontides (Monodontides) **Toxopeus, 1927**

Range.— As genus. Seven species, with one member in Sulawesi.

M. (M.) kolari Ribbe, 1926

(Pl. 8, fig. 32)

Range (2).— Mindanao, Sulawesi (N, C: Cassidy, 1995b).

****Monodontides (Buakraengius)*** **Eliot & Kawazoé, 1983**

Range.— Sulawesi (monobasic).

**M. (B.) cara* de Nicéville, 1898

Range (E).— Sulawesi (N, C, S: Cassidy, 1995b).

Euchrysops **Butler, 1900**

(plain cupids, gram blues — Pl. 8, fig. 33)

Range (1+2+4+5+6+7).— Richly represented in the Afrotropical Region, but with

only a single species in the Oriental, Australian and Pacific Regions.

Foodplants.— Boraginaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Lamiacae, Myrtaceae, Orchidaceae, Scrophulariaceae, Verbenaceae; attended by ants.

Key works.— Common & Waterhouse (1981), Corbet & Pendlebury (1992).

E. cnejus Fabricius, 1798
(Gram Blue — Pl. 8, fig. 33)

Range (1+2+4+5+6+7).— Arabia, Sri Lanka to India and Indo-China, Malay Peninsula and Philippines eastwards to C Maluku (Buru) and New Guinea, the Pacific and Australia. Watson *et al*. (1995) also record Kenya.

Foodplants.— *Cycas* (Cycadaceae); *Hevea* (Euphorbiaceae); *Abrus, Acacia, Butea, Cajanus, Canavalia, Crotalaria, Desmodium, Flemingia, Lablab, Macroptilium, Paracalyx, Phaseolus, Pisum, Psophocarpus, Pueraria, Sesbania, Vigna* (Fabaceae); *Dendrobium* (Orchidaceae); *Clerodendrum* (Verbenaceae); attended by ants (*Camponotus, Crematogaster, Iridomyrmex, Polyrhachis*). Watson *et al*. (1995) describe the life history.

— **E. cnejus* subsp. (BMNH)

Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng; Nieuwenhuis, 1946), Kep. Sula (Mangole, Sanana), Kep. Tukangbesi.

— *E. cnejus luzonicus* Röber, 1886

Range.— Philippines (Palawan, Cebu, Leyte, Luzon, Tawitawi), Kep. Sangihe, Kep. Talaud.

Note.— Treadaway (1995) includes all Philippine records within the typical subspecies, *E. cnejus cnejus*.

***Chilades* Moore, 1881**
(lime blues and grass jewels — Pl. 8, figs 34, 35)

Range (W).— Palaearctic, Afrotropical, Oriental and Australian Regions, extending to Lesser Sunda Islands, Philippines, Sulawesi, Maluku, Solomon Islands and Australia. A genus of approximately 22 species (including two species recently transferred from *Freyeria* Couvoisier, a junior synonym according to Fiedler (1991) and Hesselbarth *et al*. (1995). Three *Chilades* are found on Sulawesi.

Foodplants.— Anacardiaceae, Boraginaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Rutaceae, Tiliaceae; some species attended facultatively by ants (e.g. *Iridomyrmex*: Fiedler, in Hesselbarth *et al*., 1995).

Key works.— d'Abrera (1977, as *Luthrodes*; 1986), Corbet & Pendlebury (1992).

C. boopis Fruhstorfer, 1915
(Pl. 8, fig. 34)

Range (3+4).— Sulawesi, N & C Maluku, Misool, Waigeo.

— **C. boopis boopis* Fruhstorfer, 1915

Range.— Sulawesi (N, C), Kep. Banggai (Peleng).

C. lajus Stoll, 1780
(Lime Blue)

Range (1+2+7).— Sri Lanka to Indo-China, Taiwan and Japan, Assam, Malay

Peninsula, northern Borneo (Mangalum I.), Palawan, Philippines, Sulawesi.

Note.— Igarashi & Fukuda (2000: 563) do not include Sulawesi in the distribution of this species.

Foodplants.— ?Cycadaceae (probably refers to *Chilades pandava)*; *Atalantia*, *Citrus, Feronia, Limonia, Naringi, Severinia, Triphasia* (Rutaceae); *Tilia* (Tiliaceae). Larvae occasionally carnivorous on aphids (Agarwala & Saha, 1984). Igarashi & Fukuda (2000) illustrate the larva and pupa.

— **C. lajus cromyon* Fruhstorfer, 1916

Range.— Sulawesi (N).

C. putli Kollar, 1848

(Least Grass Jewel — Pl. 8, fig. 35)

Range (5+6).— Sri Lanka, India, Nepal, southern China, Indo-China, Java, Lesser Sunda Islands, Sulawesi, New Guinea, Australia.

Note.— Formerly included in the genus *Freyeria*, this small species appears to be absent from the Malay Peninsula, Sumatra, Borneo, Maluku and the Philippines, but its precise distribution requires confirmation. In the past *putli* has often been treated as a subspecies of *trochylus* Freyer, but more recently (e.g. Fujioka, 1970) many authors have considered it to be distinct. According to Smith (1994) both species fly in Nepal; according to Koiwaya (1989: 99) both fly in China; H.S. Rose and A.K. Sidhu (in litt., 1996) found both in India; Motono & Negishi (1989) list both for Laos, but illustrate only *putli*, suggesting that they did not find true *trochylus* locally. Treadaway (1995) lists *F. trochylus gnoma* Snellen from Luzon, but not elsewhere in the Philippines; the identity should be checked.

Foodplants.— *Heliotropium* (Boraginaceae); *Alysicarpus*, *Flemingia*, *Indigofera, Lotus, Pisum, Rhynchosia, Zornia* (Fabaceae); attended by ants (*Iridomyrmex*).

Riodinidae Grote, 1895 (1827)

(metalmarks, punches, judies — Pl. 8, figs 36, 37)

Range.— Cosmopolitan, but the great majority of the *ca* 1500 species occur in the neotropics. Five subfamilies currently recognised (but two South American groups are likely to be downgraded), only one of which occurs outside of the Americas.

Foodplants.— Myrsinaceae (in Oriental Region); many South American species are thought to be associated with ants.

Key works.— d'Abrera (1977, 1986), Harvey (1987).

Nemeobiinae Bates, 1868

(punches, judies)

Range.— Exclusively Old World, including Palaearctic, Afrotropical, Oriental, and Indo-Australian regions; of the approximately 100 species, one just reaches the northern tip of Queensland. About seven genera occur in the Malay Archipelago west of Maluku, of which two are found in Sulawesi.

Foodplants.— See family.

Key works.— Bennett (1950), Harvey (1987), Corbet & Pendlebury (1992).

Zemeros Boisduval, 1836
(punchinellos — Pl. 8, fig. 36)

Range (1+5+6+7).— Northern India and Indo-China to Lesser Sunda Islands, Palawan and Sulawesi Region. Two species, both of which have been recorded from Sulawesi (but one requires confirmation).

Foodplants.— Myrsinaceae.

Key works.— d'Abrera (1986), Corbet & Pendlebury (1992).

Z. flegyas Cramer, 1780
(Punchinello — Pl. 8, fig. 36)

Range (1+5+6+7).— Sikkim, China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan (Treadaway, 1995), Sulawesi Region.

Foodplants.— *Maesa* (Myrsinaceae). Igarashi & Fukuda (2000) illustrate foodplant and early stages.

— **Z. flegyas celebensis* Fruhstorfer, 1899
Range.— Sulawesi (C).

— **Z. flegyas sosiphanes* Fruhstorfer, 1912
Range.— Sulawesi (S).

Z. emesoides Felder & Felder, 1860

Range.— Malay Peninsula, Sumatra, Borneo, ?Banggai, ?Philippines (Sulu Archipelago - not confirmed by Treadaway, 1995), ?Sulawesi.

— **Z. emesoides* subsp. (BMNH)
Range.— Sulawesi.

Note.— Requires confirmation; Otsuka (1988) confirms only the records for Neomalaya.

Abisara Felder & Felder, 1860
(judies — Pl. 8, fig. 37)

Range (1+2+6+7).— Afrotropical and Oriental Regions, including Wallacea. About a dozen of the 30 or so species occur in the Malay Peninsula, including two on Sulawesi.

Foodplants.— Myrsinaceae.

Key works.— Bennett (1950), d'Abrera (1986), Corbet & Pendlebury (1992).

A. echerius Stoll, 1790
(Plain Judy)

Range (1+2).— Sri Lanka, India, China, Indo-China, Burma, Ryukyu Islands, Hainan, Palawan, Philippines (Basilan, Sibutu, Bongao, Sanga Sanga, Tawitawi, Panay, Mindoro, Luzon: Treadaway, 1995), Sulawesi Region.

Foodplants.— *Ardisia*, *Embelia*, *Maesa* (Myrsinaceae) (Igarashi & Fukuda, 2000, who also illustrate foodplant and early stages.

— **A. echerius bugiana* Fruhstorfer, 1904
Range.— Sulawesi (N), Bangka.

— **A. echerius celebica* Röber, 1886
Range.— Sulawesi (C, S).

— **A. echerius saleyra* Fruhstorfer, 1914
Range.— Salayar.
— **A. echerius satellitica* Nieuwenhuis, 1946
Range.— Kep. Banggai (Banggai, Peleng).
— **A. echerius porphyritica* Fruhstorfer, 1914
Range.— Kep. Sula (Sanana).

A. kausambi Felder & Felder, 1860
(Straight Plum Judy – Pl. 8, fig. 37)

Range (1+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Palawan (including Balabac and Calamian group: Treadaway, 1995), Sulawesi.

Foodplants.— *Embelia* (Myrsinaceae) (Igarashi & Fukuda, 2000, who also illustrate foodplant and early stages.
— **A. kausambi sabina* Stichel, 1924
Range.— Sulawesi (N).

Nymphalidae Rafinesque, 1815
(nymphs, browns, milkweeds, admirals, emperors)

Range.— Cosmopolitan; about 6500 species divided into 9 subfamilies and 4 tribes *incertae sedis* (Lamas *et al.*, in prep.), all of which except the Sino-Himalayan Calinaginae are represented in the Sulawesi Region.

Note added in proof. – The classification adopted here may be changed considerably in the near future, particularly with regard to the groups listed here under Biblidinae; see Wahlberg *et al.* (in press).

Foodplants.— About 100 families of flowering plants; in addition, a small number of species feed on non-flowering plants (e.g., cycads, lycopods).

Key works.— Ehrlich (1958), Kristensen (1976), Ackery (1988), Shields (1989a), Teshirogi (1990), Harvey (1991), Ackery *et al.* (1999), Brower (2000), Yoshimoto (2001), Freitas & Brown (submitted), Lamas *et al.* (in prep).

Libytheinae Boisduval, 1833
(snouts or beaks — Pl. 15, fig. 5)

Range.— Cosmopolitan. This extremely widespread group consists of 12 species, usually divided into two genera, one in the New World the other in the Old. Shields (1989b) maintains that this group should have family status, representing the stem group of a major butterfly lineage, the Nymphalidae; de Jong *et al*. (1996) confirm this relationship, but retain the snouts within the Nymphalidae *sensu lato*.

Foodplants.— Ulmaceae.

Key works.— Pagenstecher (1901), Shields (1985), Okano (1987), Ackery (1988).

***Libythea* Fabricius, 1807**
(beaks — Pl. 15, fig. 5)

Range (W).— Old World. Seven species, of which two are known from Sulawesi.

Foodplants.— Ulmaceae.

Key works.— Pagenstecher (1901), Common & Waterhouse (1981), Shields (1985), Corbet & Pendlebury (1992).

L. narina Godart, 1819
(White-spotted Beak)

Range (1+3+4+5+6).— Sikkim to northern Malaysia, Langkawi Islands, Sumatra, Java, Lesser Sunda Islands, Palawan, northern Philippines (Luzon, Mindoro: Treadaway, 1995), Sulawesi, N & C Maluku (Halmahera, Obi, Seram), New Guinea (Arfak Mts: Parsons, 1999: 484). Apparently absent from Borneo and southern Philippines.

— **L. narina canuleia* Fruhstorfer, 1909

Range.— Sulawesi, Kep. Banggai (Peleng).

L. geoffroy Godart, 1824
(Geoffroy's, Blue, Purple, Eastern or Australian Beak - Pl. 15, fig. 5)

Range (1+2+3+4+5+6).— Burma, Indo-China, Java, Lesser Sunda Islands, Mangalum Island (Sabah), Palawan, Philippines, Sulawesi, N & C Maluku, New Guinea region, Solomon Islands, New Caledonia, northern Australia.

Foodplants.— *Celtis* (Ulmaceae). Igarashi & Fukuda (2000) illustrate all life stages (Laos).

— **L. geoffroy celebensis* Staudinger, 1889

Range.— Sulawesi, Kep. Banggai (Peleng).

Morphinae Newman, 1834
(morphos, owls — Pl. 9)

Range.— Neotropical, Oriental and Australian Regions. About 240 species, divisible into three tribes (recognised by Ackery, 1988, as separate subfamilies), of which only one is represented in the Old World.

Foodplants.— Primarily monocotyledons in the Oriental and Australian Regions.

Key works.— Ehrlich (1958), DeVries *et al.* (1985), Ackery (1988).

Amathusiini Moore, 1893
(fauns, kings, saturns, duffers)

Range.— Oriental and Australian Regions. About 100 species in 13 genera, of which four are represented in Sulawesi.

Foodplants.— As subfamily.

Key works.— Stichel (1912), Kirchberg (1942), Aoki *et al.* (1982).

***Faunis* Hübner, 1819**
(fauns — Pl. 9, fig. 7)

Range (1+2+6+7).— Sikkim, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Philippines, Sulawesi Region. A medium sized genus of about 15 species, represented in the Sulawesi Region by a single but polytypic endemic.

Foodplants.— Arecaceae (*Caryota, Phoenix, Pholidocarpus*), Liliaceae (*Liriope*),

Musaceae (*Musa*), Pandanaceae (*Pandanus*), Smilacaceae (*Smilax*).

Key works.— Stichel (1912), Aoki *et al.* (1982).

**F. menado* Hewitson, 1865

(Sulawesi or Menado Faun — Pl. 9, fig. 7)

Range (R).— Sulawesi Region.

Foodplants.— Arecaceae (unidentified), recorded by Igarashi & Fukuda (2000), who illustrate the larva and pupa.

— **F. menado menado* Hewitson, 1865
Range.— Sulawesi (N).

— **F. menado zenica* Fruhstorfer, 1911
Range.— Sulawesi (C).

— **F. menado klados* Brooks, 1933
Range.— Sulawesi (C).

— **F. menado chitone* Hewitson, 1862
Range.— Sulawesi (S).

— **F. menado fruhstorferi* Röber, 1896
Range.— Sulawesi (S).

— **F. menado pleonasma* Röber, 1896
Range.— Sulawesi (SE).

— **F. menado intermedius* Röber, 1896
Range.— Kep. Banggai (Peleng).

— **F. menado syllus* Fruhstorfer, 1911
Range.— Kep. Sangihe.

— **F. menado sulanus* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole).

***Amathusia* Fabricius, 1807**

(palmkings — Pl. 9, figs 1, 4)

Range (1+2+5+6+7).— Burma, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Lombok, Borneo, Philippines, Palawan, Sulawesi Region. A genus of about a dozen butterflies, represented on Sulawesi by one widespread species and one very distinctive endemic.

Foodplants.— Arecaceae, Musaceae.

Key works.— Stichel (1912), Eliot (1964a), Aoki *et al.* (1982).

***Amathusia (Amathusia)* Fabricius, 1887**

Range.— As genus.

Foodplants.— As genus.

A. (A.) phidippus Linnaeus, 1763

(The Palmking — Pl. 9, fig. 4)

Range (1+2+5+6+7).— as genus.

Foodplants.— *Borassus, Cocos, Elaeis* (Arecaceae); *Musa* (Musaceae). Igarashi & Fukuda (1997) illustrate all life stages (Java).

— **A. (A.) phidippus celebensis* Fruhstorfer, 1763
Range.— Sulawesi, Talisei, Kep. Banggai (Peleng).

**Amathusia (Pseudamathusia)* Honrath, 1886

Range.— Sulawesi (monobasic).

**A. (P.) virgata* Butler, 1870
(Honrath's Palmking — Pl. 9, fig. 1)
Range (E).— Sulawesi.
— **A. (P.) virgata thoanthea* Fruhstorfer, 1911
Range.— Sulawesi (N, C, SE).
— **A. (P.) virgata virgata* Butler, 1870
Range.— Sulawesi (S).

Amathuxidia Staudinger, 1887
(kohinoors — Pl. 9, figs 2, 3)

Range (2+6+7).— Assam, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, southern Philippines (Treadaway, 1995), Sulawesi Region. A genus of only two species, represented in Sulawesi by an endemic.
Key works.— Stichel (1912), Aoki *et al.* (1982).

**A. plateni* Staudinger, 1887
(Platen's Kohinoor — Pl. 9, figs 2, 3)
Range (R).— Sulawesi Region.
— **A. plateni plateni* Staudinger, 1855
Range.— Sulawesi (N).
— **A. plateni iamos* Brooks, 1937
Range.— Sulawesi (C, S).
— **A. plateni pelengensis* Okano, 1986
Range.— Kep. Banggai (Peleng).
— **A. plateni suprema* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole, Sanana).

Discophora Boisduval, 1836
(duffers — Pl. 9, figs 5, 6)

Range (1+2+5+6+7).— Sri Lanka, India, Indo-China, Malay Peninsula, Sumatra, Java, Lombok, Borneo, Philippines, Sulawesi Region. A genus of of 12 or so species represented in Sulawesi, at the eastern limit of the range, by a single endemic.
Foodplants.— Arecaceae; Poaceae: Bambuseae (*Arundinaria, Bambusa, Dendrocalamus, Schizostachyum*).
Key works.— Stichel (1912), Aoki *et al.* (1982).

**D. bambusae* Felder & Felder, 1867
(Sulawesi Duffer — Pl. 9, figs 5, 6)

Range (R).— Sulawesi Region.

— **D. bambusae bambusae* Felder & Felder, 1865
Range.— Sulawesi (N, C).

— **D. bambusae celebensis* Holland, 1891
Range.— Sulawesi (S).

— **D. bambusae bangkaiensis* Fruhstorfer, 1902
Range.— Kep. Banggai (Peleng).

Satyrinae Boisduval, 1833 (1820)
(satyrs, browns — Pl. 10)

Range.— Cosmopolitan. This major group of butterflies, with perhaps 2000 or more species, is currently divided into six tribes (Harvey, 1991; Lamas *et al*., in prep.). Four are represented on Sulawesi, divided among eleven genera.

Foodplants.— Mostly monocotyledons.

Key works.— Miller (1968), Corbet & Pendlebury (1992), Aoki *et al.* (1982), Ackery (1988).

Melanitini Reuter, 1896
(evening browns — Pl. 10, figs 1-3, 7)

Range.— Palaeotropical. Five genera, of which two occur in the Sulawesi Region, one endemic, the other widespread throughout the old world tropics. Vane-Wright (1995) suggests the possibility of a sixth genus, from Papua New Guinea, based on a painting by Ellis Rowan.

Note.— This tribe is referred by Harvey (1991) as the Biini, but with removal of the monobasic neotropical genus *Bia* to the Brassolini (Vane-Wright, 1972; DeVries *et al*., 1985; Freitas *et al*., 2002; Lamas *et al*., in prep.), the correct tribal name for this residual old world group is Melanitini.

Foodplants.— Predominantly grasses (Poaceae).

Key works.— Smiles (1973), Aoki *et al.* (1982), Uémura (1987).

******Bletogona* **Felder & Felder, 1867**
(celebeans — Pl. 10, figs 1, 2, 7)

Range (E).— Sulawesi. An endemic genus of just two species. The phylogenetic relationship of *Bletogona* to other Melanitini is obscure, but *B. mycalesis* shares the same habit of being easily attracted to fruit bait, especially in the evening.

Key works.— Aoki *et al.* (1982), Uémura (1987).

**B. mycalesis* Felder & Felder, 1867
(Common Celebean — Pl. 10, fig. 1)

Range (E).— Sulawesi.

— **B. mycalesis unicolor* Martin, 1929
Range.— Sulawesi (N, C).

— **B. mycalesis mycalesis* Felder & Felder, 1867
Range.— Sulawesi (S).

**B. inexspectata* [sic!] Uémura, 1987
(New Celebean — Pl. 10, figs 2, 7)
Range (E).— Sulawesi (N, C).
Note.— Plate 10, fig. 2, illustrates the sexually dimorphic female of this taxon. See also Uémura (1993).

***Melanitis* Fabricius, 1807**
(evening browns — Pl. 10, fig. 3)

Range (W).— As tribe. A medium-sized genus of 12 species (R.L. Smiles, unpublished), many of which occur in the Indo-Australian tropics. Seven species have been found in the Sulawesi Region, each one representing a different distribution pattern.
Foodplants.— Arecaceae; ?Cyperaceae, Poaceae.
Key works.— Corbet & Pendlebury (1992), Aoki *et al.* (1982).

M. leda Linnaeus, 1758
(Common Evening Brown)
Range (W).— Ethiopian, Oriental, eastern Palaearctic and Australian Regions.
Note.— The type specimen of *obsoleta* Felder & Felder, purported to be from Sulawesi and formerly regarded to be the local subspecies of *M. leda*, represents *M. zitenius* Herbst, a species not found in the Sulawesi Region.
Foodplants.— *Cocos, Elaeis* (Arecaceae); ?Cyperaceae; *Apluda, Axonopus, Bambusa, Brachiaria, Capillipedium, Chrysopogon, Coix, Cyrtococcum, Digitaria, Eleusine, Heteropogon, Imperata, Leersia, Melinis, Microstegium, Miscanthus, Ophiuros, Oplismenus, Oryza, Panicum, Paspalum, Pennisetum, Poa, Rottboellia, Saccharum, Setaria, Sorghum, Stenotaphrum, Themeda, Thysanolaena, Zea, Zizania* (Poaceae). Bascombe *et al.* (1999) illustrate all life stages (Hong Kong).
— **M. leda celebicola* Martin, 1929
Range.— Sulawesi, Kep. Sangihe (Sangihe, Siao), Kep. Banggai (Peleng).
— *M. leda leda* Linnaeus, 1758
Range.— Sri Lanka, India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines, Tanahjampea, Kalao.
— *M. leda bouruana* Holland, 1900
Range.— Kep. Sula (Mangole), N & C Maluku, New Guinea region.

M. phedima Cramer, 1780
(Dark Evening Brown)
Range (6).— Sri Lanka to Indo-China and Japan, Malay Peninsula, Sumatra, Java, Sulawesi.
Foodplants.— *Apluda, Bambusa, Brachiaria, Capillipedium, Coix, Cyrtococcum, Eleusine, Isachne, Ischaemum, Microstegium, Miscanthus, Oplismenus, Oryza, Panicum, Saccharum, Setaria, Sorghum, Thysanolaena, Zea* (Poaceae). Bascombe *et al.* (1999) illustrate egg, larva and pupa (Hong Kong).

— **M. phedima linga* Fruhstorfer, 1908
Range.— Sulawesi.

M. velutina Felder & Felder, 1867
Range (4).— Sulawesi Region, central Maluku.
— **M. velutina velutina* Felder & Felder, 1867
Range.— Sulawesi (N, C, S).
— **M. velutina ribbei* Röber, 1886
Range.— Sulawesi (C, S, SE), Kep. Banggai.
— **M. velutina panvila* Fruhstorfer, 1911
Range.— Kep. Sula (Mangole).

M. atrax Felder, 1863
Range (P).— Philippines (excluding Palawan), Kep. Talaud, Kep. Sangihe.
— *M. atrax pitya* Fruhstorfer, 1911
Range.— Kep. Talaud, Kep. Sangihe (Sangihe, Siao).

M. boisduvalia Felder & Felder, 1863
(Boisduval's Evening Brown – Pl. 10, fig. 3)
Range (1+2).— Philippines (including Palawan: Treadaway, 1995), northern Sulawesi Region, ?Ternate.
— **M. boisduvalia ernita* Fruhstorfer, 1911
Range.— Sulawesi (N), Kep. Talaud, Kep. Sangihe (Sangihe, Siao).

M. pyrrha Röber, 1887
Range (3).— Sulawesi Region, northern Maluku (Bacan), ?Ambon.
— **M. pyrrha hylecoetes* Holland, 1890
Range.— Sulawesi.
— **M. pyrrha pyrrha* Röber, 1887
Range.— Kep. Banggai.

M. constantia Cramer, 1777
(Constantia Evening Brown)
Range (P).— Kep. Sula, N & C Maluku, New Guinea region.
Hostplants.— *Imperata* (Igarashi & Fukuda , 2000), *Saccharum, Setaria* (Parsons, 1999) (Poaceae). Igarashi & Fukuda (2000) illustrate the larva and pupa (Papua New Guinea).
— **M. constantia salapia* Fruhstorfer, 1911
Range.— Kep. Sula (Mangole, Sanana).

Elymniini Herrich-Schäffer, 1864
(Pl. 10, figs 4-6, 8, 10, 11, 14-16)

Range.— Predominantly palaeotropical, with relatively weak representation in the Palaearctic, Nearctic and Neotropical Regions. Divided into four subtribes, all represented in Sulawesi.
Foodplants.— Arecaceae, Musaceae, Poaceae (often Bambuseae).
Key works.— Miller (1968), Ackery (1988).

Elymniina Herrich-Schäffer, 1864

Range.— Palaeotropics. Two genera, one in Africa, the other in the Indo-Australian region.

Foodplants.— Arecaceae, Musaceae.

***Elymnias* Hübner, 1818**
(palmflies — Pl. 10, fig. 4)

Range (W).— Oriental and Australian Regions. Over 40 species, represented in the Sulawesi Region by five endemics.

Foodplants.— Arecaceae (*Archontophoenix, Areca, Arenga, Calamus, Caryota, Chrysalidocarpus, Cocos, Cyrtostachys, Elaeis, Licuala, Livistonia, Metroxylon, Phoenix, Pinanga, Ptychosperma, Rhapis, Roystonea, Trachycarpus*), Musaceae (*Musa*), Orchidaceae (*Acriopsis*: Igarashi & Fukuda, 1997).

Key works.— Corbet & Pendlebury (1992), Aoki *et al.* (1982).

**E. cumaea* Felder & Felder, 1867
(Pl. 10, fig. 4)

Range (R).— Sulawesi Region.

— **E. cumaea cumaea* Felder & Felder, 1867
Range.— Sulawesi (N).

— **E. cumaea toliana* Fruhstorfer, 1899
Range.— Sulawesi (N).

— **E. cumaea resplendens* Martin, 1929
Range.— Sulawesi (C).

— **E. cumaea bornemanni* Ribbe, 1889
Range.— Kep. Banggai (Peleng).

— **E. cumaea phrikonis* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole, Sanana).

**E. sangira* Fruhstorfer, 1899

Range (L).— Kep. Sangihe (Sangihe, Siao), Kep. Talaud.

**E. mimalon* Hewitson, 1862

Range (E).— Sulawesi.

— **E. mimalon mimalon* Hewitson, 1862
Range.— Sulawesi (N).

— **E. mimalon ino* Fruhstorfer, 1894
Range.— Sulawesi (C).

— **E. mimalon nysa* Fruhstorfer, 1907
Range.— Sulawesi (SE).

**E. hicetas* Wallace, 1869

Range (R).— Sulawesi, Buton.

— **E. hicetas rarior* Martin, 1929

Range.— Sulawesi (N, C).
— **E. hicetas hicetas* Wallace, 1869
Range.— Sulawesi (S).
— **E. hicetas bonthainensis* Fruhstorfer, 1899
Range.— Sulawesi (S).
— **E. hicetas hicetina* Fruhstorfer, 1904
Range.— Sulawesi (C, SE).
— **E. hicetas butona* Fruhstorfer, 1904
Range.— Buton.

**E. hewitsoni* Wallace, 1869
(Hewitson's Palmfly)

Range (R).— southern Sulawesi, Salayar.
— **E. hewitsoni hewitsoni* Wallace, 1869
Range.— Sulawesi (S).
— **E. hewitsoni atys* Fruhstorfer, 1907
Range.— Sulawesi (SE).
— **E. hewitsoni meliophila* Fruhstorfer, 1896
Range.— Salayar.

Zetherina Reuter, 1896

Range.— Indo-China, Philippines (excluding Palawan) and Sulawesi. Two genera, one of which occurs on Sulawesi.

Zethera Felder, 1861
(wallaceans — Pl. 10, fig. 6)

Range (2).— Philippines (excluding Palawan: C. G. Treadaway, pers. comm.), Sulawesi. Six species.

Foodplants.— Poaceae (*Dinochloa*).

Key works.— Vane-Wright & Smiles (1975), Aoki *et al.* (1982), Roos (1992).

**Z. incerta* Hewitson, 1861
(Great Wallacean — Pl. 10, fig. 6)

Range (E).— Sulawesi.
— **Z. incerta incerta* Hewitson, 1869
Range.— Sulawesi (N, C, S).
— **Z. incerta tenggara* Roos, 1992
Range.— Sulawesi (SE).

Z. musa Felder & Felder, 1861
Range.— Philippines (Mindanao, Basilan), ?Sulawesi Region.
— *Z. musa* subsp. (Vane-Wright & Smiles, 1975)
Range.— ?Kep. Talaud.

Lethina Reuter, 1896

Range.— As tribe. A large group of 20 or more genera, but with only one represented in Sulawesi.

Foodplants.— ?Arecaceae, Cyperaceae, Poaceae.

Lethe Hübner, 1819

(foresters and tree-browns — Pl. 10, fig. 5)

Range (W).— Sri Lanka to China, Philippines, Maluku and Lesser Sunda Islands. A genus of more than 60 species, including many in Asia, but only two (which are probably closely related) in Sulawesi.

Foodplants.— Cyperaceae (rare), Poaceae (mainly Bambuseae).

Key works.— Corbet & Pendlebury (1992), Aoki *et al.* (1982).

L. europa Fabricius, 1775

(Bamboo Tree-brown — Pl. 10, fig. 5)

Range (W).— India, Indo-China, Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Bambusa, Dinochloa, Microstegium, Phyllostachys, Pleioblastus* (Poaceae). Igarashi & Fukuda (1997) illustrate the larva and pupa (Philippines); Bascombe *et al.* (1999) illustrate all life stages (Hong Kong).

— **L. europa arcuata* Butler, 1868

Range.— Sulawesi (N, C, SE), Kep. Banggai (Peleng).

— **L. europa nagaraja* Fruhstorfer, 1911

Range.— Sulawesi (S), Salayar.

— **L. europa velitra* Fruhstorfer, 1911

Range.— Kep. Sangihe, Kep. Talaud.

— **L. europa anatha* Fruhstorfer, 1911

Range.— Kep. Sula (Mangole, Sanana).

**L. violae* Tsukada & Nishiyama, 1979

(Violet Tree-brown)

Range (E).— Sulawesi (C).

Mycalesina Reuter, 1896

Range.— Palaeotropics. A group of about 12 genera, of which four occur in the Indo-Australian region, including the very large *Mycalesis*; two of the genera are endemic to the Sulawesi Region.

Foodplants.— Poaceae.

Orsotriaena Wallengren, 1858

(niggers, or jungle browns — Pl. 10, fig. 8)

Range (W).— Oriental and Australian Regions. Two species, both present in Sulawesi.

Foodplants.— Poaceae.

Key works.— Aoki *et al.* (1982).

O. medus Fabricius, 1775

(The Nigger)

Range (W).— Sri Lanka, southern India, Nepal, Sikkim, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands.

Foodplants.— *Imperata, Oryza, Oplismenus, Panicum* (in captivity), *Saccharum* (Poaceae). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).

— *O. medus medus* Fabricius, 1775

Range.— As species, including Sulawesi, Kep. Talaud (Salebabu), Kep. Sangihe (Sangihe, Siao), Salayar, Tanahjampea, Kep. Tukangbesi (Binongko, Kaledupa), Kep. Banggai (Peleng), but not Sri Lanka, southern India, Nicobars, Mentawi Islands, northern Queensland and Bismarcks.

Note: H. Gaonkar (pers. comm.) considers that the true type locality for *medus* is southern India; the nomenclature of the subspecies will therefore need revision.

**O. jopas* Hewitson, 1864

(Sulawesi Jungle Brown — Pl. 10, fig. 8)

Range (R).— Sulawesi Region.

— **O. jopas jopas* Hewitson, 1864

Range.— Sulawesi (N, C, SE), Kep. Talaud, ?Kep. Banggai.

Note.— Nieuwenhuis (1946) states that *jopas* does not occur in Kep. Banggai.

— **O. jopas mendice* Fruhstorfer, 1911

Range.— Sulawesi (S).

— **O. jopas paupercula* Fruhstorfer, 1908

Range.— Kep. Bowokan, Kep. Sula (Mangole, Sanana).

***Mycalesis* Hübner, 1818**

(bush browns — Pl. 10, figs 10, 11)

Range (W).— Oriental and Australian Regions. A large genus of perhaps 100 or more species, still in need of much revision; seven species have been found in the Sulawesi Region.

Foodplants.— Poaceae.

Key works.— Corbet & Pendlebury (1992), Aoki *et al.* (1982).

**M. itys* Felder, 1867

(Itys Bush Brown — Pl. 10, fig. 10)

Range (R).— Sulawesi Region.

Foodplants.— *Paniscum psilopodium* (Igarashi & Fukuda, 2000), who also illustrate the larva and pupa.

— **M. itys itys* Felder, 1867

Range.— Sulawesi (N).

— **M. ityes remulina* Fruhstorfer, 1897
Range.— Sulawesi (N, C, S, SE).
— **M. ityes sulensis* Grose Smith & Kirby, 1896
Range.— Kep. Sula (Mangole).

M. janardana Moore, 1858
(Common Bush Brown, Janardana Bush Brown)

Range (2+3+5+6+7).— Malay Peninsula, Sumatra, Java, Bali, Lombok, Borneo, southern Philippines (Treadaway, 1995), Sulawesi Region, northern Maluku.

Foodplants.— *Digitaria, Oplismenus, Paspalum* (Poaceae). Igarashi & Fukuda (2000) illustrate all life stages.
— **M. janardana opaculus* Fruhstorfer, 1908
Range.— Sulawesi, Kep. Sangihe (Sangihe), Salayar.
— **M. janardana besina* Fruhstorfer, 1908
Range.— Kep. Sula (Mangole, Sanana, ?Bowokan).

M. perseus Fabricius, 1775
(Dingy Bush Brown)

Range (W).— Sri Lanka, India, China, Burma, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region, Solomon Islands, northern Australia. Uémura (1985b) includes this and the next three species in the *mineus* species group, a group of about 20 species distributed from Sri Lanka to Vanuatu.

Foodplants.— *Axonopus* (in captivity), *Dichanthium, Heteropogon, Imperata, Oplismenus* (in captivity), *Oryza, Panicum* (in captivity), *Themeda*; also on introduced *Panicum* in Australia (all Poaceae). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).
— *M. perseus lalassis* Hewitson, 1864
Range.— Sulawesi, Tanahjampea, Kep. Tukangbesi (Kaledupa), Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana), N & C Maluku, New Guinea region, Solomon Islands.

M. horsfieldi Moore, 1892
(Horsfield's Bush Brown)

Range (1+6+7).— Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Sulu Archipelago (Treadaway, 1995), Sulawesi Region.

Note.— Aoki *et al.* (1982) and Uémura (1985b) place *newayana* Fruhstorfer as a separate endemic species from southern Sulawesi; we treat it here as a subspecies of *horsfieldi*. For a description of the female, see Uémura (1993).

Foodplants.— *Imperata, Oryza, Panicum, Saccharum* (Poaceae). Igarashi & Fukuda (2000) illustrate all life stages
— **M. horsfieldi tessimus* Fruhstorfer, 1908
Range.— Sulawesi (N), Kep. Banggai (Peleng), ?Kep. Sula.
— **M. horsfieldi newayana* Fruhstorfer, 1911
Range.— Sulawesi (S), Kabaena.
— **M. horsfieldi ptyleus* Fruhstorfer, 1908
Range.— Salayar.

M. mynois Hewitson, 1864
(Pl. 10, fig. 11)

Range (5).— Lesser Sunda Islands (Lombok to Timor), Tanahjampea, Sulawesi (S).
— **M. mynois* subsp. (Zoölogisch Museum, Amsterdam)

Range.— Tanahjampea, Sulawesi (S). The identity of this material, much darker than typical *mynois*, requires further investigation.

M. mineus Linnaeus, 1758
(Dark-brand Bush Brown)

Range (P).— Sri Lanka, India, China, Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines (absent from Mindanao region: Uémura, 1985b; Treadaway, 1995), Kalao, Tanahjampea.

Foodplants.— *Eleusine, Leersia, Lophatherum, Microstegium, Pogonatherum, Saccharum, Thysanolena* (Poaceae). Bascombe *et al.* (1999) illustrate all life stages (Hong Kong).
— **M. mineus* subsp. (BMNH)

Range.— Kalao, Tanahjampea.

M. sirius Fabricius, 1775
(Cedar Bush Brown)

Range (P).— Kep. Sula, C Maluku, New Guinea region, Australia.

Foodplants.— *Imperata, Ischaemum, Panicum, Themeda*; also on introduced *Panicum* in Australia (all Poaceae).
— **M. sirius* subsp. (BMNH)

Range.— Kep. Sula (Mangole, Sanana).

******Lohora* **Moore, 1880**
(Sulawesi browns — Pl. 10, figs 15, 16)

Range (R).— Sulawesi Region, including Kep. Sangihe, Kep. Banggai, Kep. Sula, Kabaena and Buton. The largest generic group of butterflies endemic to the Sulawesi Region, all 17 species would formerly have been included within *Mycalesis*. Separation of *Lohora* may render *Mycalesis* paraphyletic. Reliable recognition of a number of *Lohora* taxa, notably those related to *ophthalmicus*, seems difficult. Unlike most *Mycalesis*, *Lohora* species show little differentiation of the male genitalia.

Foodplants.— Undoubtedly various Poaceae, including *Centotheca* (Igarashi & Fukuda, 2000).

Key works.— Aoki *et al.* (1982), Vane-Wright & Fermon (2003).

******Lohora (Lohora)* **Moore, 1880**

Range.— As genus, but not known from Kep. Sula.

Foodplants.— As genus.

**L. (L.) dexamenus* Hewitson, 1862

Range (E).— Sulawesi (N, C).

**L. (L.) transiens* Fruhstorfer, 1908

Range (R).— Sulawesi (C, SE; see Roos, 1995), Buton, Kabaena (Vane-Wright & Fermon, 2003).

**L. (L.) dinon* Hewitson, 1864

Range (E).— Sulawesi (S).

**L. (L.) tilmara* Fruhstorfer, 1906

Range (L).— Kep. Sangihe (Sangihe, Siao).

**L. (L.) anna* Vane-Wright & Fermon (2003)
=*Lohora deianira* Hewitson, [1862], sensu Aoki *et al.* 1982, nec Hewitson.
Misidentification.

Range (E).— Sulawsei (C).

**L. (L.) ophthalmicus* Westwood, 1888

Range (R).— Sulawesi (N, C), Talisei, Lembeh.

Foodplants.— *Centotheca longilamina* (Poaceae), recorded by Igarashi & Fukuda (2000), who also illustrate all life stages.

**L. (L.) unipupillata* Fruhstorfer, 1898

Range (E).— Sulawesi (C, SE).

**L. (L.) haasei* Röber, 1887

Range (L).— Kep. Banggai (Peleng).

***_Lohora (Physcon)_ de Nicéville, 1898**

Range.— Sulawesi and Kep. Sula.

Foodplants.— Unknown, probably Poaceae.

**L. (Ph.) inga* Fruhstorfer, 1899

Range (L).— Kep. Sula (Mangole, Sanana).

**L. (Ph.) pandaea* Hopffer, 1874

Range (E).— Sulawesi (N, C).

Range.— Sulawesi (N).

**L. (Ph.) deianirina* Fruhstorfer, 1897

Range.— Sulawesi (N, C). See Vane-Wright & Fermon (2003) regarding taxonomic status.

**L. (Ph.) decipiens* Martin, 1929

Range (E).— Sulawesi (N, C).

**L. (Ph.) umbrosa* Roos, 1997

Range (E).— Sulawesi (SE).

**L. (Ph.) deianira* Hewitson, 1862

Range (E).— Sulawesi (N).

**L. (Ph.) imitatrix* Martin, 1929
(Pl. 10, fig. 16)

Range (E).— Sulawesi (C).

**L. (Ph.) erna* Fruhstorfer, 1898

Range (E).— Sulawesi (S).

******Lohora (Pseudomycalesis)* **Tsukada & Nishiyama, 1979**

Range.— Sulawesi (monobasic).
Foodplants.— unknown.

L. (Ps.) tanuki Tsukada & Nishiyama, 1979
(Pl. 10, fig. 15)

Range (E).— Sulawesi (C, E).

******Nirvanopsis* **Vane-Wright, new name**
= *Nirvana* Tsukada & Nishiyama, 1979, not *Nirvana* Kirkaldy, 1900
(Hemiptera: Cicadellidae)
(Pl. 10, fig. 14)

Range (E).— Sulawesi (C, E).

This beautiful monobasic genus appears to be very closely related to *Lohora* (Vane-Wright & Fermon, 2003); its status may have to be re-assessed after a cladistic analysis of the Mycalesina.

Key works.— Aoki *et al.* (1982).

**N. hypnus* Tsukada & Nishiyama, 1979
(The Hypnotist — Pl. 10, fig. 14)

Range (E).— as genus.

Ragadiini Herrich-Schäffer, 1864
(Pl. 10, figs 12, 13)

Range.— Assam, Indo-China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region, northern Maluku and Irian Jaya. Two genera, one of which occurs in Sulawesi; the two only overlap in the Philippines.

Foodplants.— Selaginellaceae.

Key works.— Aoki *et al.* (1982), Vane-Wright (1990), Igarashi & Fukuda (1997).

Acrophtalmia Felder, 1861
(pale ringlets — Pl. 10, figs 12, 13)

Range (2+3+4).— Philippines (excluding Palawan), Sulawesi Region, Buru, northern Maluku, Irian Jaya. About five or six species occur in the Philippines, one or two in Sulawesi, and one in Maluku. The Allyn Museum of Entomology (Florida) has three male specimens of an *Acrophtalmia* from the Arfak Mts, Irian Jaya, which appear to represent an endemic race of *A. chione* Felder & Felder, the Maluku taxon (L. & J. Miller, pers. comm.).

Hostplants.— Selaginellaceae (*Selaginella*).

Key works.— Uémura & Yamaguchi (1982), Aoki *et al.* (1982), Igarashi & Fukuda (1997).

**A. leuce* Felder & Felder, 1867
(Pl. 10, fig. 13)

Range (R).— Sulawesi Region (excluding S).

Foodplants.— *Selaginella delicatula* (Igarashi & Fukuda, 2000), who also illustrate the larva and pupa.

— **A. leuce leuce* Felder & Felder, 1867
Range.— Sulawesi (N, C).

— **A. leuce banggaaiensis* Nieuwenhuis, 1946
Range.— Kep. Banggai (Peleng).

— **A. leuce chionides* de Nicéville, 1900
Range.— Kep. Sula (Mangole, Sanana).

**A. windorum* Miller & Miller, 1978
(Pl. 10, fig. 12)

Range (E).— Sulawesi (N, C).

The status and distribution of this taxon requires investigation; the late A. Bedford Russell (pers. comm.) considered it to be a subspecies of *leuce*.

Satyrini Boisduval, 1833 (1820)
(browns, graylings, ringlets — Pl. 10, fig. 9)

Range.— Cosmopolitan. Ten subtribes are recognised, of which only one is represented in the Sulawesi Region.

Foodplants.— Mostly Poaceae.

Key works.— Miller (1968), Ackery (1988).

Ypthimina Reuter, 1896

Range.— Palaeotropics, with weak extension into the Palaearctic Region. Of the dozen or more genera, only one occurs in Sulawesi.

Foodplants.— Cyperaceae, Juncaceae, Poaceae, Restoniaceae, Zingiberaceae.

Ypthima Hübner, 1818
(rings — Pl. 10, fig. 9)

Range (W).— Palaeotropics, including Australia if *Xois arctous* is included (see Shirôzu & Shima, 1979; Parsons, 1999: 567). A large genus of more than 100 species. Shima (1988) recognised two subgenera, both represented in the Sulawesi Region (one by a single endemic species, the other by seven, five of which are endemic).

Hostplants.— Various genera of Poaceae.

Key works.— Corbet & Pendlebury (1992), Shirôzu & Shima (1979), Aoki *et al.* (1982), Uémura (1982; 1985a, 1999), Shima (1988).

Ypthima (Thymipa) Moore, 1893
(rings)

Range.— Oriental Region, about 40 species divided by Shima (1988) into three species groups, one of which extends eastwards through the Malay Archipelago to N Maluku and Timor.

Foodplants.— Poaceae (including *Miscanthus, Oplismenus, Pogonatherum).*

**Y. (T.) nynias* Fruhstorfer, 1911

Range (R).— Sulawesi Region. A member of the *philomela*-group (Shima, 1988), a group of about ten species distributed from Sri Lanka to China and Japan, and through the Malay Archipelago to the Philippines, Sulawesi Region, northern Maluku and Timor.

— **Y. (T.) nynias nynias* Fruhstorfer, 1911
Range.— Sulawesi, Muna, Buton.

— **Y. (T.) nynias aretas* Fruhstorfer, 1911
Range.— Salayar.

— **Y. (T.) nynias gadames* Fruhstorfer, 1911
Range.— Kep. Banggai (Peleng).

Ypthima (Ypthima) Hübner, 1818
(rings)

Range.— Palaeotropics, including part of Pacific, and with some extension into southern Palaearctic. Over 60 species, many African, divided by Shima (1988) into nine groups, two of which are represented in the Sulawesi Region.

Foodplants.— Poaceae (including *Bambusa, Cynodon, Digitaria, Ehrharta, Imperata, Microstegium, Oplismenus, Paspalum, Pogonatherum*).

Y. (Y.) norma Westwood, 1851

Range (4+5).— Burma, Indo-China, China, northern Philippines (north Luzon: Treadaway, 1995), Lesser Sunda Islands, southern Sulawesi Region, central Maluku (Buru, Ambon). A member of the *asterope*-group (Shima, 1988), richly represented in the Afrotropical Region, but with only two species in the Orient, extending east from India to central Maluku and the Lesser Sunda Islands.

— *Y. (Y.) norma pusilla* Fruhstorfer, 1911
Range.— Sulawesi (C, S), Buton, Buru, Ambon.

Y. (Y.) kalelonda Westwood, 1888

Range (3).— Sulawesi Region, northern Maluku. This and the remaining five *Ypthima* belong to the *pandocus*-group (Shima, 1988; Uémura, 1999), about a dozen species with a collective distribution extending from Thailand through the Malay Archipelago to Bali, Borneo, Philippines, Sulawesi Region and northern Maluku.

— **Y. (Y.) kalelonda kalelonda* Westwood, 1888
Range.— Sulawesi (N), Talisei.
— **Y. (Y.) kalelonda celebensis* Rothschild, 1892
Range.— Sulawesi (C, S).
— **Y. (Y.) kalelonda anana* Fruhstorfer, 1911
Range.— Sulawesi (SE).
— **Y. (Y.) kalelonda mangolina* Uémura, 1982
Range.— Kep. Sula (Mangole, Sanana).

**Y. (Y.) risompae* Uémura, 1982

Range (E).— Sulawesi (C).

Foodplants.— Unknown in nature, *Miscanthus* (in captivity) (Poaceae) (Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

**Y. (Y.) ancus* Fruhstorfer, 1911

Range (E).— Sulawesi (S).

**Y. (Y.) gavalisi* Martin, 1913
(Pl. 10, fig. 9)

Range (E).— Sulawesi (N, C).

**Y. (Y.) junkoae* Uémura, 1999

Range (E).— Sulawesi (C).

**Y. (Y.) loryma* Hewitson, 1865

Range (R).— Sulawesi, Buton.

Foodplants.— Unidentified species of Poaceae (Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

Charaxinae Guénée, 1865
(charaxids — Pl. 11, figs 1, 2)

Range.— cosmotropical, with moderate extension into temperate regions. Six tribes, of which two occur in the Indo-Australian region, with only one represented in Sulawesi.

Foodplants.— Recorded from more than 30 families of flowering plants, notably the Convolvulaceae, Fabaceae, Flacourtiaceae, Euphorbiaceae, Piperaceae, Sapindaceae.

Key works.— Rydon (1971), Corbet & Pendlebury (1992), Ackery (1988), Teshirogi (1990), Tsukada (1991).

Charaxini Guénée, 1865
(nawabs, rajahs)

Range.— Palaeotropics. Two major genera, both present in Sulawesi.
Foodplants.— A variety of families, with Fabaceae most characteristic.
Key works.— As subfamily.

Charaxes Ochsenheimer, 1816
(rajahs, pashas — Pl. 11, fig. 1)

Range (W).— Palaeotropics with some extension into temperate regions. The genus is most richly represented in Africa (by 152 species: Henning, 1989); about 25 occur in the Indo-Australian region.

Foodplants.— Annonaceae, Euphorbiaceae, Fabaceae, Lauraceae, Meliaceae, Rutaceae (Oriental representatives only).

Key works.— Corbet & Pendlebury (1992), Tsukada (1991).

C. latona Butler, 1865
(Orange Emperor)

Range (P).— Kep. Sula, northern Maluku, New Guinea region including Bougainville, and northern Australia (Common & Waterhouse, 1981).

Foodplants.— *Dalbergia, Pterocarpus* (Fabaceae); *Aglaia, Dysoxylum* (Meliaceae); *Cryptocarya, Litsea* (Lauraceae). Parsons (1999) illustrates all life stages (Papua New Guinea).

— **C. latona artemis* Rothschild, 1900
Range.— Kep. Sula (Mangole, Sanana, Taliabu).

**C. nitebis* Hewitson, 1862
(Green Rajah)

Range (R).— Sulawesi Region.

— **C. nitebis nitebis* Hewitson, 1862
Range.— Sulawesi.

— **C. nitebis sulaensis* Rothschild, 1900
Range.— Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana, Taliabu).

**C. affinis* Butler, 1865

Range (R).— Sulawesi Region.

Foodplants.— *Manihot* (Euphorbiaceae) (recorded by Igarashi & Fukuda, 1997, who illustrate the larva and pupa), and *Persea americana* (Lauraceae) (recorded by Teshirogi, 2001, who also illustrates the larva and pupa).

— **C. affinis affinis* Butler, 1865
Range.— Sulawesi, Kep. Togian.

— **C. affinis butongensis* Tsukada, 1991
Range.— Buton, Kabaena.

— **C. affinis spadix* Tsukada, 1991
Range.— Kep. Banggai (Peleng).

**C. musashi* Tsukada, 1991
(Sulawesi Tawny Rajah)

Range (E).— Sulawesi (C).

**C. mars* Staudinger, 1885
(Iron Rajah)

Range (E).— Sulawesi (N, C, S).

Note.— Nieuwenhuis (1959) described the female, also illustrated by Tsukada (1991). *C. m. dohertyi* Rothschild, 1892, is a synonym (Tsukada, 1991); *C. madensis* Rothschild, 1899, from Buru, which has been treated as a subspecies of *C. mars*, is evidently a separate, very distinct species.

**C. setan* Detani, 1983
(Black Rajah)

Range (L).— Kep. Banggai (Peleng).

C. solon Fabricius, 1793
(Wise Rajah)

Range (1+2+7).— Sri Lanka, India, Burma, Thailand, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Acacia, Dalbergia, Moullava, Pithecellobium, Tamarindus, Wagatea, Xylia* (Fabaceae). Igarashi & Fukuda (1997) illustrate the larva and pupa (Philippines).

— **C. solon hannibal* Butler, 1869
Range.— Sulawesi.

— **C. solon catulus* Fruhstorfer, 1914
Range.— Siao, Kep. Sangihe, Kep. Talaud.

— **C. solon brevis* Tsukada, 1991
Range.— Buton.

— **C. solon iliona* Tsukada, 1991
Range.— Kep. Banggai (Peleng).

— **C. solon mangolianus* Rothschild, 1900
Range.— Kep. Sula (Mangole, Sanana).

C. bernardus Fabricius, 1793
(Pl. 11, fig. 1)

Range.— Sri Lanka, Peninsular India, Nepal to south China, Malay Peninsula, Sumatra, Java, Bali, Bawean, Kangean, Borneo, ?Sulawesi.

Foodplants.— Various Annonaceae, Euphorbiaceae, Fabaceae, Lauraceae, and Rutaceae noted by Igarashi & Fukuda (1997), who also illustrate all life stages (Hong Kong).

— *C. bernardus repetitius* Butler, 1896
Range.— Borneo, ?N Sulawesi.

Note.— Four male specimens in BNMH possibly from Sulawesi, apparently from three independent sources but all with poor data (one indicates "Menado"), are phenotypically very similar or identical to Bornean *C. bernardus repetitius*. So far as we are aware, this species was not collected during the *Project Wallace* expedition, and Tsuka-

da (1991) does not record it from Sulawesi. Generally similar in appearance to the endemic *C. affinis*, these BMNH *bernardus* specimens probably have false data. Unfortunately, before this anomaly was realised, the "Menado" specimen was photographed as the representative *Charaxes* to be illustrated.

***Polyura* Billberg, 1820**

(nawabs — Pl. 11, fig. 2)

Range (W).— Oriental, Australian and Pacific Regions. About 27 species, of which three occur on Sulawesi.

Foodplants.— Anonaceae (*Annona*), Clusiaceae (*Mesua*), Connaraceae (*Rourea*), Euphorbiaceae (*Bridelia*), Fabaceae (*Abarema, Acacia, Adenanthera, Albizia, Archidendron, Caesalpinia, Cassia, Cynometra, Delonix, Leucaena, Millettia, Moullava, Pararchidendron, Paraserianthes, Parkia, Peltophorum, Pithecellobium, Poinciana, Robinia, Senna, Wagatea, Wisteria*), Fagaceae (*Castanopsis*), Lauraceae (*Cinnamomum*), Lythraceae (*Lagerstroemia*), Oleaceae (*Jasminium*), Rhamnaceae (*Rhamnella, Ventilago*), Rhizophoraceae (*Bruguiera, Rhizophora*), Rosaceae (*Prunus, Rosa*), Sapindaceae (*Nephelium*), Simaroubaceae (*Guilfoylia*), Sterculiaceae (*Brachychiton, Sterculia, Theobroma*), Tiliaceae (*Grewia*), Ulmaceae (*Celtis, Trema*), Verbenaceae (*Tectona*).

Key works.— Common & Waterhouse (1981), Smiles (1982), Tsukada (1985, 1991), Teshirogi (1990), Corbet & Pendlebury (1992).

**P. inopinatus* Röber, 1939

Range (E).— Sulawesi (N).

Note.— Described by Röber (1940) from a single male from Tondano, this distinctive taxon was overlooked by Smiles (1982). Tsukada (1991: 236) reproduces the original colour illustration; so far as we are aware, no further material of this beautiful species has come to light.

**P. cognata* Vollenhoven, 1861

(Sulawesi Blue Nawab — Pl. 11, fig. 2)

Range (R).— Sulawesi Region.

— **P. cognata cognata* Vollenhoven, 1861
Range.— Sulawesi (N, C, and including SE: Roos, 1995)

— **P. cognata bellona* Tsukada, 1991
Range.— Sulawesi (S), Kep. Tukangbesi (Hanafusa, 1985).

— **P. cognata yumikoe* Nishimura, 1984
Range.— Kep. Banggai (Peleng).

P. alphius Staudinger, 1886

(Staudinger's Nawab)

Range (5+6).— India, Nepal, Burma, Java, Lesser Sunda Islands, Sulawesi. Otsuka (1988) included this Sulawesi butterfly within *P. athamas*, but Smiles (1982) had separated it as a distinct species under the name *agraria* Swinhoe, 1887. Tsukada (1991) placed the two disjunct groups of populations grouped by Smiles under the older name *alphius* Staudinger.

— **P. alphius piepersianus* Martin, 1924
Range.— Sulawesi (probably S only).

P. galaxia Butler, 1865
(Kalao Nawab)

Range (P).— Lesser Sunda Islands (Lombok to Tanimbar), Kalao.
— **P. galaxia kalaonicus* Rothschild, 1898
Range.— Kalao, Tanahjampea.

Biblidinae Boisduval, 1833
(Pl. 12, figs 6-12; Pl. 13, figs 1-10; Pl. 14, figs 1, 5)

Range.— More usually known as the "Limenitinae" or "Limenitidinae" (e.g. Harvey, 1991), this large group of well over 1000 species and 100 genera (Ackery *et al.*, 1999) is now widely regarded as a paraphyletic or even polyphyletic assemblage (e.g. Brower, 2000). The artificial combination is maintained here, under the senior name Biblidinae, awaiting a definitive proposal for their re-classification (e.g. Wahlberg *et al*., in press). Here we recognise four tribes: Cyrestini *incertae sedis*, Biblidini, Pseudergolini *incertae sedis*, and Limenitidini *incertae sedis*. The last named tribe will probably prove to be very distinct, but even with its exclusion, the first three are not likely to form a natural group.

Foodplants.— See individual tribes.

Key works.— Ackery (1988), Teshirogi (1990), Harvey (1991), Corbet & Pendlebury (1992), Ackery *et al.* (1999), Brower (2000), Wahlberg *et al*. (in press), Freitas & Brown (submitted).

Cyrestini Guénée, 1865, *incertae sedis*
(map wings — Pl. 13, figs 5, 7)

Range.— Three genera in the palaeotropics (but not Australia), two of which represented on Sulawesi, with a fourth, perhaps doubtfully related genus in the New World (*Marpesia*). Freitas & Brown (submitted) have proposed to include this group within the resurrected Biblidinae. Parsons (1999), placed *Cyrestis* and its allies in the Apaturinae. Wahlberg *et al.* (in press) propose promoting the map wings to subfamily rank, the Cyrestinae, to include the Cyrestini and Pseudergolini as its constituent tribes.

Foodplants.— Dilleniaceae, Moraceae.

Key works.— Holloway (1973), Ackery (1988), Teshirogi (1990), Corbet & Pendlebury (1992), Parsons (1999), Brower (2000).

***Chersonesia* Distant, 1883**
(maplets — Pl. 13, fig. 5)

Range (1+2+6+7).— Northern India, Indo-China, China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region. About seven species, one of which occurs in Sulawesi.

Foodplants.— Moraceae.

Key works.— Holloway (1973), Tsukada (1985), Corbet & Pendlebury (1992).

C. rahria Moore, 1858
(Wavy Maplet — Pl. 13, fig. 5)

Range (1+6+7).— Thailand, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Sulawesi Region.

Foodplants.— *Ficus* (Moraceae). Igarashi & Fukuda (1997) illustrate the larva and pupa (Malaya).

— **C. rahria celebensis* Rothschild, 1892
Range.— Sulawesi (including SE: Roos, 1995), Kep. Togian.

— **C. rahria banggaina* Tsukada & Nishiyama, 1985
Range.— Kep. Banggai (Peleng).

— **C. rahria mangolina* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole, Sanana).

***Cyrestis* Boisduval, 1832**
(map wings — Pl. 13, fig. 7)

Range (W).— Oriental Region to China and Japan, and Malaya Archipelago to the Solomons and New Caledonia, but absent from Australia. A genus of perhaps 25 species, depending on taxonomic limits (see Parsons, 1999: 582), of which five occur in the Sulawesi Region, three of them exhibiting eastern links to Maluku and the Papuan Region. See also Introduction and fig. 13.

Foodplants.— Dilleniaceae, Moraceae.

Key works.— Holloway (1973), Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992), Parsons (1999).

C. paulinus Felder & Felder, 1860
(Paulinus Map)

Range (3+4).— Sulawesi Region, N & C Maluku, New Guinea (Vogelkop).

Foodplants.— *Streblus ilicifolius* (Moraceae), recorded by Igarashi & Fukuda (2000), who also illustrate all life stages.

— **C. paulinus mantilis* Staudinger, 1886
Range.— Sulawesi (N, C), Kep. Togian (Dolong).

— **C. paulinus kransi* Jurriaanse & Lindemans, 1920
Range.— Butung, Wowoni.

— **C. paulinus kuehni* Röber, 1886
Range.— Kep. Banggai (Peleng).

— **C. paulinus seneca* Wallace, 1869
Range.— Kep. Sula (Mangole, Sanana).

**C. heracles* Staudinger, 1896
Range (R).— Sulawesi, Kep. Sula, Salayar.

— **C. heracles heracles* Staudinger, 1896
Range.— Sulawesi (N, C), Kep. Sula (Mangole).

— **C. heracles selayarensis* Hanafusa, 1993
Range.— Salayar.

C. thyonneus Cramer, 1779
(Pl. 13, fig. 7)

Range (4).— Sulawesi Region, central Maluku. Appears closely related to *C. theresae*, from Sumatra and Borneo.

— **C. thyonneus celebensis* Staudinger, 1896
Range.— Sulawesi, Kabaena.

— **C. thyonneus pelensis* Detani, 1983
Range.— Kep. Banggai (Peleng).

— **C. thyonneus sulaensis* Staudinger, 1896
Range.— Kep. Sula (Mangole, Sanana).

**C. eximia* Oberthür, 1879
Range (L).— Kep. Sangihe (Sangihe, Tona Tahuna, Siao).

**C. strigata* Felder & Felder, 1867
(Celebes Map)

Range (R).— Sulawesi Region. This species is intimately related to the *acilia*-group (Tsukada, 1985), which is distributed from Buru to the Solomon Islands.

Foodplants.— *Streblus* (Moraceae) (recorded by Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

— **C. strigata strigata* Felder & Felder, 1867
Range.— Sulawesi, Kep. Togian (Dolong), Kabaena, Wowoni, Butung.

— **C. strigata parthenia* Röber, 1887
Range.— Kep. Banggai (Peleng).

— **C. strigata bettina* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole, Sanana).

Biblidini Boisduval, 1833
(Pl. 12, figs 10-12)

Range.— Mainly Neotropical, but also Afrotropical and Oriental Regions, east to Maluku. Up to 40 genera included, just two of which occur on Sulawesi. Freitas & Brown (submitted) propose to place this group within the resurrected subfamily Biblidinae. Harvey (1991) divided the group into seven subtribes, only one of which occurs in the Sulawesi Region. Wahlberg *et al.* (in press) likewise recognise these seven tribes, within the resurrected subfamily Biblidinae *sensu stricto*.

Foodplants.— Casuarinaceae, Euphorbiaceae, Malvaceae, Passifloraceae (in Oriental Region).

Key works.— Ackery (1988), Teshirogi (1990), Harvey (1991), Corbet & Pendlebury (1992), Brower (2000).

Eurytelina Doubleday, 1845

Range.— Palaeotropics. Two of the nine genera occur in Sulawesi.

Foodplants.— Mainly Euphorbiaceae.

Ariadne Horsfield, 1829

(castors — Pl. 12, figs 10, 11)

Range (W).— Oriental Region including Lesser Sunda Islands, Philippines, Sulawesi Region and N & C Maluku. A genus of about 14 species, 5 of which occur in Africa, and 4 are found in the Sulawesi Region.

Foodplants.— Casuarinaceae, Euphorbiaceae, Malvaceae, Passifloraceae (*Adenia*: Igarashi & Fukuda, 1997).

Key works.— Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

A. ariadne Linnaeus, 1763

(Angled Castor)

Range (P).— Sri Lanka, India, Indo-China, China, Japan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Butung, Muna, Kabaena.

Foodplants.— *Acalypha, Cnesmone, Ricinus, Tragia* (Euphorbiaceae). Teshirogi (1990) (Japan) and Igarashi & Fukuda (1997) (Malaya) illustrate all life stages, as do Bascombe *et al.* (1999) (Hong Kong).

— *A. ariadne gedrosia* Fruhstorfer, 1912
Range.— Lesser Sunda Islands, Butung, Muna, Kabaena.

A. specularia Fruhstorfer, 1899

Range (P).— Thailand (Otsuka, 1988; Pinratana & Eliot, 1996), Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Kalao.

— **A. specularia intermedia* Fruhstorfer, 1899
Range.— Sumbawa, Alor, Kalao.

**A. celebensis* Holland, 1891

(Celebes Castor — Pl. 12, fig. 10)

Range (E).— Sulawesi.

— **A. celebensis dongalae* Fruhstorfer, 1903
Range.— Sulawesi (N, C).

— **A. celebensis* subsp. (Roos, 1995)
Range.— Sulawesi (SE).

— **A. celebensis celebensis* Holland, 1891
Range.— Sulawesi (S).

**A. merionoides* Holland, 1891

(Holland's Castor — Pl. 12, fig. 11)

Range (R).— Sulawesi Region.

— **A. merionoides merionoides* Holland, 1891
Range.— Sulawesi, Talisse, Butung, Kabaena.

— **A. merionoides pecten* Tsukada, 1985
Range.— Kep. Banggai (Peleng).

— **A. merionoides sulaensis* Joicey & Talbot, 1922
Range.— Kep. Sula.

Laringa Moore, 1901
(dandies — Pl. 12, fig. 12)

Range (1+6+7).— Burma, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Sulawesi. Two species, one of which has been found in Sulawesi.

Key works.— Tsukada (1985), Corbet & Pendlebury (1992).

L. castelnaui Felder & Felder, 1860
(Blue Dandy — Pl. 12, fig. 12)

Range (1+6+7).— Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Sulawesi.

— **L. castelnaui* subsp. (d'Abrera, 1985)

Range.— Sulawesi (C).

Pseudergolini Jordan, 1898, *incertae sedis*
(Pl. 13, figs 8, 9)

Range.— Indo-Australian region, extending to Japan (but not Australia). A small group of four or five genera (see Morishita, 1995), two of which occur on Sulawesi.

This tribal group has long been included in the "Limenitidinae", but its correct position could be within the Apaturinae (Pinratana & Eliot, 1996; Parsons, 1999). Teshirogi (1990) proposed placing *Dichorragia* in a separate subfamily, the Dichorragiinae, while Harvey (1991) placed it in the Cyrestini. Igarashi & Fukuda (1997) noted a striking peculiarity of both *Pseudergolis* and *Dichorragia*, whereby the first-instar larvae make, at the edge of a leaf, a rod-like structure fashioned from chewed leaf fragments, and then rest along the underside of this fine projection. However, the precise interpretation of this behaviour may be problematic, as Parsons (1999: 581) describes the process rather differently, and notes that identical or very similar behaviour is also exhibited by the early instars of some *Cyrestis*, which he also included in the Apaturinae. The work of Brower (2000) offers little support for a close link between the Apaturinae and *Cyrestis*. Here we maintain the Pseudergolini sensu Morishita (1995) as a separate tribe, *incertae sedis* within the Biblidinae. Wahlberg *et al.* (in press) propose to include the Pseudergolini as a second tribe within a newly-promoted subfamily Cyrestinae.

Foodplants.— Anacardiaceae, Burseraceae, Meliosmaceae, Urticaceae.

Key works.— Ackery (1988), Teshirogi (1990), Corbet & Pendlebury (1992), Morishita (1995), Pinratana & Eliot (1996), Fukuda & Igarashi (1997), Parsons (1999).

Dichorragia Butler, 1869
(constables — Pl. 13, fig. 8)

Range (W).— Northern India, Thailand, China, Taiwan, Japan, Malay Peninsula, Sumatra, Java, Lesser Sundas, Borneo, Palawan, Philippines, Sulawesi Region, Maluku, New Guinea region. Two allopatric species.

Foodplants.— Anacardiaceae (Smiles in litt: Parsons, 1999), Burseraceae (*Canarium*: Igarashi & Fukuda, 1997), Meliosmaceae.

Key works.— d'Abrera (1977), Teshirogi (1990), Tsukada (1991), Corbet & Pendlebury (1992).

D. nesimachus Doyère, 1840
(The Constable — Pl. 13, fig. 8)

Range (1+2+3+5+6+7).— Northern India, Thailand, China, Taiwan, Japan, Malay Peninsula, Sumatra, Java, Bali, Lombok, Borneo, Palawan, Philippines, Sulawesi Region, N Maluku.

Foodplants.— *Meliosma* (Meliosmaceae). Teshirogi (1990) (Japan) and Igarashi & Fukuda (1997) (Taiwan) illustrate all life stages, as do Bascombe *et al.* (1999) (Hong Kong).

— **D. nesimachus pelurius* Fruhstorfer, 1897
Range.— Sulawesi (N, C).

— **D. nesimachus harpalycus* Fruhstorfer, 1913
Range.— Kep. Banggai (Peleng).

— **D. nesimachus peisandrus* Fruhstorfer, 1913
Range.— Kep. Sula (Mangole).

***Pseudergolis* Felder & Felder, 1867**
(tabbies — Pl. 13, fig. 9)

Range (D).— India, China, Burma, Thailand, Sulawesi. The disjunct distribution of the three species comprising this small genus led Corbet & Pendlebury (1978) to speculate it "must once have occurred in Sundaland, where it is now apparently extinct." *Pseudergolis* is a distinctive genus, offering the only example of a distribution pattern of this type in the Sulawesi butterfly fauna.

Foodplants.— Urticaceae.

Key works.— Tsukada (1991); Pinratana & Eliot (1996), Harada (1997), Fukuda & Igarashi (1997).

**P. avesta* Felder & Felder, 1867
(Sulawesi Tabby — Pl. 13, fig. 9)

Range (R).— Sulawesi, Butung.

Foodplants.— *Pipturus argenteus* (Urticaceae), recorded by Igarashi & Fukuda (2000), who also illustrate the larva and pupa.

— **P. avesta avesta* Felder & Felder, 1867
Range.— Sulawesi (N, C).

— **P. avesta toalarum* Fruhstorfer, 1912
Range.— Sulawesi (S).

— **P. avesta nimbus* Tsukada, 1991
Range.— Butung.

Limenitidini Behr, 1864, *incertae sedis*
(admirals, sergeants, commanders — Pl. 13, figs 1-4, 6, 10; Pl. 14, figs 1, 5)

Range.— Cosmopolitan. A large, distinct and diverse assemblage of many species,

in over 40 genera. Harvey (1991) divided the group into four subtribes, all of which are represented on Sulawesi. As noted above, the Limenitidines almost certainly do not belong to the Biblidinae, but no definitive reclassification has yet been published. Wahlberg *et al.* (in press) propose to recognise the four subtribes of Harvey as tribes, within the subfamily Limenitidinae *sensu stricto*.

Foodplants.— Numerous families, including Anacardiaceae, Bombacaceae, Caprifoliaceae, Clusiaceae, Euphorbiaceae, Fabaceae, Fagaceae, Hypericacae, Loranthaceae, Naucleaceae, Oleaceae, Passifloraceae, Rhamnaceae, Rubiaceae, Salicaceae, Sapindaceae, Sterculiaceae, Ulmaceae and Urticaceae.

Key works.— Chermock (1950), Ackery (1988), Corbet & Pendlebury (1992).

Limenitidina Behr, 1864

(admirals, sergeants, commanders — Pl. 14, figs 1, 5)

Range.— Cosmopolitan. A large group of species in about 20 genera, 5 of which occur on Sulawesi.

Foodplants.— Principally Caprifoliaceae, Naucleaceae, Rubiaceae, Salicaceae, Ulmaceae, Urticaceae.

Key works.— Chermock (1950), Ackery (1988), Corbet & Pendlebury (1992).

***Tarattia* Moore, 1898**

(commanders — not illustrated)

Range (1+2+7).— Northern Borneo, Palawan, Philippines, Sulawesi Region. Four species, separated from *Moduza* and placed in the resurrected genus *Tarattia* by Hanafusa (1989) and Tsukada (1991), two of which occur in the Sulawesi Region.

Foodplants.— Rubiaceae (*Wendlandia*) (Igarashi & Fukuda, 2000).

Key works.— Tsukada (1991).

**T. lysanias* Hewitson, 1859

Range (R).— Sulawesi Region.

— **T. lysanias lysanias* Hewitson, 1859

Range.— Sulawesi, Kabaena.

— **T. lysanias aberrans* Hanafusa, 1989

Range.— Muna.

— **T. lysanias hiromii* Hanafusa, 1989

Range.— Kep. Banggai (Peleng).

— **T. lysanias karschi* Fruhstorfer, 1912

Range.— Kep. Sula (Mangole, Sanana, Taliabu).

**T. bruijni* Oberthür, 1879

Range (L).— Kep. Sangihe.

Note.— Incorrectly spelled '*brujini*' by Tsukada (1991)

Athyma Westwood, [1850]

(sergeants — Pl. 14, fig. 5)

Range (1+2+5+6+7).— India (including Andamans), China, Japan, Malay Archipelago to Palawan, Philippines, Sulawesi, Java, Lesser Sunda Islands (to Flores) and Sulawesi Region. *Athyma* includes about 15-20 species (Tsukada, 1985; Bascombe *et al.*, 1999); the single Sulawesi representative has only recently been placed in the genus (Igarashi, 1997).

Foodplants.— Euphorbiaceae, Oleaceae, Rubiaceae (*Adina, Mussaenda*: Bascombe *et al.*, 1999).

Key works.— Tsukada (1991), Corbet & Pendlebury (1992), Igarashi (1997).

**A. libnites* Hewitson, 1859

(Pl. 14, fig. 5)

Range (R).— Sulawesi, Kep. Banggai.

Foodplants.— *Glochidion philippicum* (Euphorbiaceae), as recorded by Igarashi & Fukuda (2000), who illustrate all life stages.

— **A. libnites libnites* Hewitson, 1859
Range.— Sulawesi.

— **A. libnites noctesco* Tsukada, 1991
Range.— Butung, Muna, Kabaena.

— **A. libnites nieuwenhuisi* Hanafusa, 1989
Range.— Kep. Banggai (Peleng).

Moduza Moore, 1881

(commanders — not illustrated)

Range (1+2+5+6+7).— Indo-Australian region eastwards to Palawan, Philippines, Sulawesi Region, Lesser Sundas and ?C Maluku. A small group of about 12 species (Bascombe *et al.*, 1999) none of which occurs further east than the Moluccas (and Maluku requires confirmation); represented on Sulawesi by two endemic species.

Foodplants.— Rubiaceae (*Mussaenda, Nauclea, Timonias, Uncaria, Wendlandia*).

Key works.— Tsukada (1991), Corbet & Pendlebury (1992), Igarashi (1997).

**M. lymire* Hewitson, 1859

Range (R).— Sulawesi Region.

— **M. lymire lymire* Hewitson, 1859
Range.— Sulawesi.

— **M. lymire munaensis* Hanafusa, 1989
Range.— Muna, Butung.

— **M. lymire nectareus* Tsukada, 1991
Range.— Kabaena.

— **M. lymire citatus* Tsukada, 1991
Range.— Kep. Togian (Waleabahi).

— **M. lymire potens* Hanafusa, 1989
Range.— Kep. Banggai (Peleng).

— **M. lymire neolymira* Fruhstorfer, 1913
Range.— Kep. Sula (Mangole, Sanana, Taliabu).

**M. lycone* Hewitson, 1859

Range (R).— Sulawesi Region.
— **M. lycone lycone* Hewitson, 1859
Range.— Sulawesi (N), Bangka.
— **M. lycone lyconides* Fruhstorfer, 1913
Range.— Sulawesi (S), Butung, Wowoni, Muna.
— **M. lycone kojimai* Detani, 1983 (= *obatratus* Tsukada, 1991)
Range.— Kep. Banggai (Peleng).
— **M. lycone nubilus* Tsukada, 1991
Range.— Kep. Sula (Sanana).

***Lamasia Moore, 1898**

(not illustrated)

Range (R).— Sulawesi Region. Tsukada (1991) has recently separated this species from *Moduza*, in the resurrected monobasic genus *Lamasia*.

Key works.— Tsukada (1991).

**L. lyncides* Hewitson, 1859

Range (R).— Sulawesi, Kep. Banggai.
— **L. lyncides lyncides* Hewitson, 1859
Range.— Sulawesi (N, C, S).
— **L. lyncides eutenia* Fruhstorfer, 1913
Range.— Sulawesi (S).
— **L. lyncides togiana* Tsukada, 1991
Range.— Kep. Togian.
— **L. lyncides notus* Tsukada, 1991
Range.— Muna.
— **L. lyncides amarapta* Fruhstorfer, 1913
Range.— Kep. Banggai (Peleng).

***Tacola* Moore, 1898**

(sergeants — Pl. 14, fig. 1)

Range (1+2+4+6+7).— Malay Peninsula, Sumatra, Java, Borneo, Palawan, southern and central Philippines, Sulawesi Region, northern and central Maluku. Until recently the single Sulawesi representative (*T. eulimene*) was included in the genus *Athyma* Westwood (e.g. Corbet & Pendlebury, 1992), a widespread group of about 15 species. Tsukada (1991), however, placed it in the resurrected genus *Tacola*, to include also *A. magindana* and *A. larymna*.

Key works.— Tsukada (1985, 1991).

T. eulimene Godart, 1824
(Sulawesi Sergeant — Pl. 14, fig. 1)

Range (3+4).— Sulawesi Region, N & C Maluku (Buru, Ambon, Seram, Obi, Bacan: Tsukada, 1991).

— **T. eulimene badoura* Butler, 1866
Range.— Sulawesi.

— **T. eulimene hegelochus* Fruhstorfer, 1913
Range.— Kep. Banggai.

— **T. eulimene symphelus* Fruhstorfer, 1913
Range.— Kep. Sula (Taliabu, Sanana).

Neptina Newman, 1870
(aeroplanes, sailers, lascars — Pl. 12, figs 6-9)

Range.— Palaearctic, Afrotropical, Oriental and Australian Regions. Five genera are recognised, one widespread in the Old World, the others restricted to the Indo-Pacific. Four of these genera occur in Sulawesi and, with one exception, all of the species are local endemics - and that exception (*Pantoporia antara*) extends only as far as Buru where, according to Eliot (1969), "it must be a recent arrival from the Sula Is., since it has not yet developed strong subspecific characters."

Foodplants.— Bombacaceae, Clusiaceae, Fabaceae, Sterculiaceae, Ulmaceae (in the Austro-Orient).

Key works.— Eliot (1969).

***Pantoporia* Hübner, 1819**
(lascars, planes, aeroplanes — Pl. 12, fig. 6)

Range (W).— Oriental and Australian Regions, including N & C Maluku. About 14 species, only one of which occurs in the Sulawesi Region.

Note.— Pinratana & Eliot (1996) place *Pantoporia* as a subgenus of *Neptis*.

Foodplants.— Fabaceae (*Abarema, Acacia, Albizia, Archidendron, Austroteenisia, Dalberga, Derris, Kuntsleria, Lonchocarpus, Parkia, Pithecellobium*); Poaceae (*Isachne*: Igarashi & Fukuda, 1997); ?Sapindaceae (Braby, 2000).

Key works.— Eliot (1969), Common & Waterhouse (1981), Tsukada (1985), Corbet & Pendlebury (1992).

P. antara Moore, 1858
(Pl. 12, fig. 6)

Range (3+4).— Sulawesi Region, Maluku (Buru, Bacan).

— **P. antara antara* Moore, 1858
Range.— Sulawesi (N, C).

— **P. antara pytheas* Fruhstorfer, 1913
Range.— Sulawesi (C, S), Kep. Tukangbesi (Kapolla, Kaledupa), Kabaena, Butung.

— **P. antara sulana* Eliot, 1969
Range.— Kep. Banggai (Peleng), Kep. Sula.

Lasippa Moore, 1898
(lascars — Pl. 12, fig. 7)

Range (1+2+6+7).— Oriental Region, extending eastwards to the Philippines and Sulawesi Region; absent from Lesser Sunda Islands. About 10 species, one of which occurs in Sulawesi.

Note.— Pinratana & Eliot (1996) place *Lasippa* as a subgenus of *Neptis*.

Foodplants.— Hypericaceae (*Cratoxylon*), Combretaceae (*Quisqualis*), Fabaceae (*Dalbergia*), Rhamnaceae (*Ventilago*).

Key works.— Eliot (1969), Tsukada (1985), Corbet & Pendlebury (1992).

**L. neriphus* Moore, 1889
(Pl. 12, fig. 7)

Range (R).— Sulawesi Region.

Foodplants.— *Ventilago oblongifolia* (Rhamnaceae), as recorded by Igarashi & Fukuda (2000), who also illustrate the larva and pupa.

— **L. neriphus tawayana* Fruhstorfer, 1899

Range.— Sulawesi, Kep. Togian ("Dolong"), Kep. Banggai (Peleng), Butung, Kabaena, Muna.

— **L. neriphus sangira* Fruhstorfer, 1908

Range.— Kep. Sangihe (Sangihe).

— **L. neriphus neriphus* Hewitson, 1868

Range.— Kep. Sula.

Neptis Fabricius, 1807
(sailers, planes, aeroplanes — Pl. 12, figs 8, 9)

Range (1+2+5+6+7).— Afrotropical, Oriental, Australian and southern Palaearctic Regions. In addition to a major (and distinctive) group of *Neptis* in the Afrotropical Region, there are about 70 species distributed through the south-eastern Palaearctic and Indo-Australian area (with only one species in Australia itself). A maximum of four *Neptis* occur in the Sulawesi Region. So far as we are aware, the genus is not positively recorded from N & C Maluku (although Parsons, 1999, includes "Moluccas"), other than Kep. Sula and Gebe.

Foodplants.— Aceraceae, Bombacaceae, Convolvulaceae, Corylaceae, Fabaceae, Lauraceae, Malvaceae, Moraceae, Rosaceae, Sterculiaceae (Parsons, 1999), Tiliaceae, Ulmaceae, Urticaceae, ?Verbenaceae (Parsons, 1999) (Indo-Australian records only).

Key works.— Eliot (1969), Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

**N. celebica* Moore, 1899
(Celebes Sailer — Pl. 12, fig. 8)

Range (R).— Sulawesi Region.

— **N. celebica oresta* Fruhstorfer, 1913

Range.— Sulawesi (N).

— **N. celebica celebica* Moore, 1899

Range.— Sulawesi (S).

— **N. celebica arachroa* Fruhstorfer, 1913

Range.— Kep. Sula (Mangole).

N. cymela Felder & Felder, 1863

Range.— Philippines (excluding Palawan), ?Sulawesi.

— **N. cymela anemorcia* Fruhstorfer, 1913

Range.— ?Sulawesi (very doubtful; requires confirmation).

**N. ida* Moore, 1858

(Pl. 12, fig. 9)

Range (R).— Sulawesi Region.

Note.— There is considerable confusion surrounding the subspecific taxonomy of this insect; we have followed Tsukada (1985), not Eliot (1969), but extensive material in the ZSBS suggests that *ida* s.str. applies to a bright southern race with narrow hindwing submarginal spots, *celebensis* applies to a bright Minahassa race with broad hindwing submarginal spots, and that other northern, central and south-eastern populations are mostly dull (white markings "sullied") and referable to *carbonespersa* Martin, 1924.

Foodplants.— *Desmodium* (Fabaceae) (recorded by Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

— **N. ida ida* Moore, 1858

Range.— Sulawesi (N).

— **N. ida celebensis* Hopffer, 1874

Range.— Sulawesi (N, C), Kep.Togian, Kep. Banggai (Peleng).

— **N. ida sphaerica* Fruhstorfer, 1907

Range.— Sulawesi (C, S, SE).

— **N. ida saleyra* Fruhstorfer, 1908

Range.— Salayar.

— **N. ida liliputa* Martin, 1924

Range.— Butung, Muna, Kabaena.

— **N. ida kalidupa* Eliot, 1969

Range.— Kep. Tukangbesi (Kaledupa)

N. hylas Linnaeus, 1758

(Common Sailer)

Range (P).— Sri Lanka, India, China, Japan, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Sulu islands, Tanahjampea, Bonerate, Kalao, Kep. Tukangbesi.

Foodplants.— Numerous genera in ?Bombacaceae, Fabaceae (*Canavalia, Crotalaria, Desmodium, Flemingia, Lathyrus, Lespedeza, Mucuna, Paracalyx, Psophocarpus, Pueraria, Rhynchosia, Tadehagi, Vigna*), ?Icacinaceae, Malvaceae, Moraceae (*Broussonetia*), ?Sterculiaceae, Tiliaceae, Ulmaceae (*Trema*). Teshirogi (1990) and Igarashi & Fukuda (1997) illustrate all life stages (Japan), as do Bascombe *et al.* (1999) (Hong Kong).

— *N. hylas timorensis* Röber, 1891

Range.— Lesser Sunda Islands (except Flores to Pura), Tanahjampea, Bonerate, Kalao, Kep. Tukangbesi (Kaledupa).

Phaedyma Felder, 1861
(sailers, planes, aeroplanes — not illustrated)

Range (1+2+3+4+5+6).— Oriental Region, extending to central China, Lesser Sunda Islands, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, and northern and eastern Australia, but absent from Borneo. About a dozen species, represented on Sulawesi by a single endemic.

Note.— Pinratana & Eliot (1996) place *Phaedyma* as a subgenus of *Neptis*.

Foodplants.— Bombacaceae (*Bombax*), Boraginaceae (*Cordia, Ehretia*: Braby, 2000), Hypericaceae (*Cratoxylon*), Fabaceae (*Dalbergia, Desmodium, Mucuna, Pongamia, Pterocarpus, Pteroloma, Tadehagi*), Rhamnaceae (*Sageretia*), Sterculiaceae (*Brachychiton, Reevesia, Sterculia*), Tiliaceae (*Grewia*: Braby, 2000), Ulmaceae (*Aphananthe, Celtis*), Verbenaceae (*Petraeovitex*).

Key works.— Eliot (1969), Tsukada (1985), Corbet & Pendlebury (1992).

**P. daria* Felder & Felder, 1867
Range (R).— Sulawesi Region.

— **P. daria daria* Felder & Felder, 1867
Range.— Sulawesi (N).

— **P. daria hiereia* Fruhstorfer, 1913
Range.— Sulawesi (C), Kep. Banggai (Peleng).

— **P. daria albescens* Rothschild, 1892
Range.— Sulawesi (C, S), Kabaena.

— **P. daria osima* Fruhstorfer, 1913
Range.— Kep. Sula.

Parthenina Reuter, 1896
(clippers — Pl. 13, fig. 4)

Range.— Oriental and Australian Regions, to Solomon Islands (but not Australia). Two genera, one restricted to India-Sundaland.

Foodplants.— ?Cucurbitaceae, ?Menispermaceae, Passifloraceae.

Key works.— Corbet & Pendlebury (1992).

Parthenos Hübner, 1819
(clippers — Pl. 13, fig. 4)

Range (1+2+3+4+6+7).— Oriental and Australian Regions, from Sri Lanka to the Solomon Islands, but absent from the Lesser Sunda Islands and Australia. A small genus with one very widespread species and, in the eastern part of the range, two further species.

Foodplants.— As tribe.

Key works.— d'Abrera (1977), Corbet & Pendlebury (1992).

P. sylvia Cramer, 1775
(The Clipper — Pl. 13, fig. 4)

Range (1+2+3+4+6+7).— Sri Lanka, India, China, Thailand, Malay Peninsula,

Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands.

Foodplants.— ?Cucurbitaceae (Parsons, 1999); ?*Tinospora* (Menispermaceae); *Adenia*, *Passiflora* (Passifloraceae) (Ackery, 1988; Parsons, 1999: 588; Igarashi & Fukuda, 2000). Igarashi & Fukuda (2000) also illustrate all life stages (Malaya).

— **P. sylvia salentia* Hopffer, 1874
Range.— Sulawesi.

— **P. sylvia sangira* Talbot, 1932
Range.— Kep. Sangihe (Sangihe).

— **P. sylvia bangkaiensis* Fruhstorfer, 1913
Range.— Kep. Banggai (Peleng).

— **P. sylvia sulana* Fruhstorfer, 1898
Range.— Kep. Sula (Mangole, Sanana).

Adoliadina Doubleday, 1845

(dukes, barons, counts — Pl. 13, figs 1-3, 6, 10)

Range.— Palaeotropics. About a dozen genera, with five occurring in the Indo-Australian Region - of which all but the Oriental *Tanaecia* occur in Sulawesi.

Foodplants.— Mainly found on Anacardiaceae, Clusiaceae, Euphorbiaceae, Fagaceae, Loranthaceae and Sapindaceae.

Key works.— Ackery (1988), Corbet & Pendlebury (1992).

***Lexias* Boisduval, 1832**

(archdukes — Pl. 13, fig. 2)

Range (1+2+3+4+6+7).— Oriental Region eastwards to Java, Philippines, Sulawesi Region, N & C Maluku and the New Guinea region. A genus of about a dozen species, divisible into two groups, the Moluccan and Oriental. Sulawesi has a representative of the Oriental group, while the Moluccan species occurs in the eastern part of the Sulawesi Region.

Foodplants.— Clusiaceae (*Calophyllum, Garcinia*), Hypericacae (*Cratoxylum*).

Key works.— d'Abrera (1977), Tsukada (1991), Corbet & Pendlebury (1992).

**L. aeetes* Hewitson, 1861
Range (R).— Sulawesi Region.

— **L. aeetes aeetes* Hewitson, 1861
Range.— Sulawesi (N).

— **L. aeetes phasiana* Butler, 1870
Range.— Sulawesi (S).

— **L. aeetes satellita* Jurriaanse & Lindemans, 1920
Range.— Sulawesi (C - Tsukada, 1991), Wowoni.

— **L. aeetes butongensis* Tsukada, 1991
Range.— Butung, Kabaena.

— **L. aeetes rubellio* Fruhstorfer, 1898
Range.— Kep. Banggai (Peleng).

L. aeropa Linnaeus, 1764
(Orange-banded Plane)

Range (P).— Kep. Sula, N & C Maluku, New Guinea region, including northern tip of Queensland.

Foodplants.— *Calophyllum* (Clusiaceae: Braby, 2000).

— **L. aeropa orestias* Fruhstorfer, 1913

Range.— Kep. Sula (Mangole).

Euthalia Hübner, 1819
(barons, counts, duchesses, earls, marquesses — Pl. 13, figs 1, 6)

Range (1+2+5+6+7).— Oriental Region, from Sri Lanka eastwards to China, Java, Lesser Sunda Islands, Philippines and Sulawesi Region. A genus of over 20 species, divided into the *aconthea* and *lubentina* species groups. The former is represented on Sulawesi by *E. aconthea* itself (only recently discovered there: Müller, 1994), and the latter by an endemic species found on Sulawesi and various nearby islands, and a further endemic restricted to the Sula Archipelago.

Note.— Pinratana & Eliot (1996) and Yokochi (1999b) include within *Euthalia* a number of groups separated by Tsukada and others as full genera.

Foodplants.— Anacardiaceae, Asteraceae, Cucurbitaceae, Dipterocarpaceae, Ebenaceae, Euphorbiaceae, Fagaceae, Loranthaceae, Melastomataceae, Moraceae, Rosaceae, Sapindaceae.

Key works.— Talbot (1943), Tsukada (1991), Corbet & Pendlebury (1992), Igarashi & Fukuda (1997), Yokochi (1999a,b,c,d).

E. aconthea Cramer, 1777
(The Baron)

Range (1+5+6+7).— Sri Lanka, S India and N India eastwards to southern China, Malay Peninsula, Andamans, Sumatra, Java, Kangean, Lesser Sunda Islands, Palawan, SW Philippines (Bongao, Sibutu, Jolo) and Sulawesi.

— **E. aconthea bakrii* Müller, 1994

Range.— Sulawesi (S).

**E. amanda* Hewitson, 1862
(Sulawesi Gaudy Baron — Pl. 13, figs 1, 6)

Range (R).— Sulawesi Region.

Foodplants.— *Scurrula* (Loranthaceae: recorded by Igarashi, 1994, and Igarashi & Fukuda, 1997, who also illustrate larva and pupa).

— **E. amanda amanda* Hewitson, 1862 (= *rubicundus* Tsukada, 1991; see Yokochi, 1999c)

Range.— Sulawesi, Kabaena, Butung, Muna (Yokochi, 1999d), WangiWangi.

— **E. amanda selayarensis* Tsukada, 1991

Range.— Salayar. The male is described by Yokochi (1996).

— **E. amanda* subsp. (BMNH)

Range.— Tanahjampea.

— **E. amanda periya* Fruhstorfer, 1913

Range.— Kep. Banggai (Peleng). Lectotype designated by Yokochi (1999c).

**E. amabilis* Staudinger, 1896

Range (L).— Kep. Sula (Mangole, Sanana, Taliabu: Yokochi, 1999d).

Yokochi (1999a) selected a lectotype from Mangole, in Zoologisches Museum der Humboldt Universität, Berlin. *Euthalia amanda sulaensis* Talbot, 1943, is a synonym (lectotype designated by Yokochi, 1999c).

***Dophla* Moore, 1880**

(dukes — Pl. 13, fig. 3)

Range (1+2+6+7).— Sri Lanka, India, Indo-China, Hainan, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Sulawesi Region. Pinratana & Eliot (1996) and Yokochi (1999b) place the monobasic *Dophla* as a subgenus of *Euthalia*.

Foodplants.— Anacardiaceae, Ebenaceae, Euphorbiaceae, Fagaceae.

Key works.— Corbet & Pendlebury (1992).

D. evelina Stoll, 1790

(Redspot Duke — Pl. 13, fig. 3)

Range (1+2+6+7).— As genus.

Foodplants.— *Anacardium* (Anacardiaceae), *Diospyros* (Ebenaceae), *Antidesma* (Euphorbiaceae), *Lithocarpus* (Fagaceae). Igarashi & Fukuda (1997) illustrate all life stages (Malaya).

— **D. evelina bolitissa* Fruhstorfer, 1913
Range.— Sulawesi (N).

— **D. evelina dermoides* Rothschild, 1892
Range.— Sulawesi (N, C), Salayar, Kabaena.

— **D. evelina bangkaiana* Fruhstorfer, 1904
Range.— Kep. Banggai (Peleng).

— **D. evelina fumosa* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole, Sanana).

***Bassarona* Moore, 1897**

(marquesses — Pl. 13, fig. 10)

Range (1+2+5+6+7).— Oriental Region, from Assam to Java, Flores, Philippines and Sulawesi. A small genus represented in the Sulawesi Region by a single endemic. Pinratana & Eliot (1996) and Yokochi (1999b) place *Bassarona* as a subgenus of *Euthalia*.

Key works.— Tsukada (1991), Corbet & Pendlebury (1992).

**B. labotas* Hewitson, 1864

(Sulawesi Marquis — Pl. 13, fig. 10)

Range (R).— Sulawesi, Butung, Kep. Banggai.

— **B. labotas labotas* Hewitson, 1864
Range.— Sulawesi.

— **B. labotas pallesco* Tsukada, 1991
Range.— Butung.

— **B. labotas pelengensis* Yokochi, 1990
Range.— Kep. Banggai (Peleng).

Apaturinae Boisduval, 1840
(Pl. 15, figs 1-4)

Range.— Cosmopolitan (but absent from Australia). Over 400 species in about 22 genera, 20 of which occur in the Old World, 6 in Malaysia, and 4 on Sulawesi. Additionally, Pinratana & Eliot (1996) include the four genera of the Pseudergolini within this subfamily (see also Parsons, 1999: 581; Lamas *et al.* in prep.).

Foodplants.— Betulaceae, Carpinaceae, Fagaceae, Salicaceae, Ulmaceae.

Key works.— Le Moult (1950), Rydon (1971), DeVries *et al.* (1985), Ackery (1988), Teshirogi (1990), Corbet & Pendlebury (1992), Pinratana & Eliot (1996).

Rohana Moore, 1880
(black princes — Pl. 15, fig. 1)

Range (1+2+6+7).— Sri Lanka, India, China, Burma, Thailand, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi. A small group of five or six species, with a single representative in Sulawesi.

Foodplants.— Ulmaceae (*Celtis*).

Key works.— Le Moult (1950), Nguyen-Phung (1985), Tsukada (1991), Corbet & Pendlebury (1992).

**R. macar* Wallace, 1869
(Wallace's Black Prince — Pl. 15, fig. 1)

Range (R).— Sulawesi Region. Until resurrected by Tsukada (1991), this taxon was generally included as a subspecies within *R. rhea* Felder (Philippines, including Palawan).

— **R. macar macar* Wallace, 1869
Range.— Sulawesi, Muna, Kep. Banggai (Peleng: Nieuwenhuis, 1946).

— **R. macar butongensis* Tsukada, 1991
Range.— Buton.

Helcyra Felder, 1860
(white emperors — Pl. 15, fig. 2)

Range (3+4+5+6+7).— Northern India, Thailand, China, Taiwan, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines (Luzon), Sulawesi, northern and central Maluku, New Guinea region. Rare butterflies with partly discontinuous distributions. Parsons (1999) considered that there were only four species, but Le Moult (1950) listed five, one having been found on Sulawesi. A species from Luzon, noted in Treadaway (1995), was described by Tsukada (1991), and a Lesser Sundas subspecies (of *H. hemina*) by Kotaki (1985). Masui & Inomata (1992) recognised seven species.

Foodplants.— Ulmaceae (*Celtis*).

Key works.— Evans (1932), Le Moult (1950), d'Abrera (1977), Tsukada (1991), Masui & Inomata (1992), Masui (1999).

**H. celebensis* Martin, 1913
(Sulawesi White Emperor — *cf.* Pl. 15, fig. 2)

Range (R).— Sulawesi, Kep. Banggai. Until separated by Tsukada (1991), this taxon was regarded as a subspecies of *H. hemina* Hewitson, from SE Asia, Sumatra, Java and Borneo.

— **H. celebensis celebensis* Martin, 1913 (= *c. australis* Tsukada, 1991)
Range.— Sulawesi (C, N, S).

— **H. celebensis fabulose* Tsukada, 1991
Range.— Kep. Banggai (Peleng).

— **H. celebensis semifusca* Masui, 1999
Range.— Buton.

***Hestinalis* Bryk, 1938**
(sorcerers — Pl. 15, fig. 3)

Range (2+6).— Northern India, China, Malay Peninsula, Sumatra, Java, Philippines (not Palawan), Sulawesi. This interesting genus comprises a number of apparently mimetic butterflies, and has an unusual distribution. Formerly included in *Hestina* Westwood, the single Sulwesi endemic was placed by Le Moult (1950; see also Morishita, 1997), together with two other former *Hestina* species, in the genus *Hestinalis* Bryk. Tsukada (1991) extended this usage to cover at least six species.

Foodplants.— Ulmaceae (*Celtis*).

Key works.— Le Moult (1950), Teshirogi (1990), Tsukada (1991), Corbet & Pendlebury (1992).

**H. divona* Hewitson, 1851
(Sulawesi Sorcerer — Pl. 15, fig. 3)

Range (E).— Sulawesi (N, C; see Roos, 1995).

***Euripus* Doubleday, 1848**
(courtesans — Pl. 15, fig. 4)

Range (1+2+6+7).— Northern India, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan, Philippines, Sulawesi. Another small but interesting genus, with a total of about five species, represented on Sulawesi by a single endemic.

Foodplants.— Ulmaceae (*Celtis, Trema*), Urticaceae.

Key works.— Le Moult (1950), Tsukada (1991), Corbet & Pendlebury (1992).

**E. robustus* Wallace, 1869
(Wallace's Courtesan — Pl. 15, fig. 4)

Range (E).— Sulawesi.

Nymphalinae Rafinesque, 1815
(admirals, pansies, leaf-butterflies — Pl. 14, figs 2-4, 6-12)

Range.— Cosmopolitan. A major group, with perhaps 50 or more genera divided

into four tribes, two of which are represented in the Sulawesi Region.

Foodplants.— A variety of flowering plant families, but mainly Acanthaceae and Urticaceae.

Key works.— Ackery (1988), Nakanishi (1988), Teshirogi (1990), Harvey (1991), Brower (2000), Nylin *et al.* (2001).

Nymphalini Rafinesque, 1815

(admirals, jesters, painted ladies, tortoiseshells, commas — Pl. 14, figs 3, 6, 7, 10, 11)

Range.— As subfamily. About a hundred species, a number of them very familiar and frequently referred to as "vanessids" (a synonym), are included in this cosmopolitan group. Three of the 13 genera occur in the Sulawesi Region.

Foodplants.— Largely as subfamily, but *Kaniska* has apparently "host shifted" to various Liliales.

Key works.— As subfamily.

Symbrenthia Hübner, 1819

(jesters — Pl. 14, figs 6, 7, 11)

Range (W).— Oriental, south-eastern Palaearctic and Australian Regions (but not Australia). Five of the known species occur on Sulawesi. Parsons (1999) considers there to be 13 species, but due to taxonomic problems the total is very uncertain. Here we follow Tsukada (1985) and Motono & Negishi (1989) in applying the name *lilaea*, but not *hippoclus*, to one of the species found on the Asian mainland. Koiwaya (1989) applied *hippoclus* (type-locality Ambon) to a species that includes China within its range. Parsons (1999) apparently applies *hippoclus* to a taxon occuring from India and China through the Malay Archipelago, as far east as Bougainville. We treat *hippoclus* here as a species extending from Thailand to Maluku. Note added in proof: Fric *et al.* (submitted) now propose to include the formerly separate Papuan region genus *Mynes* within *Symbrenthia*, bringing the group to over two dozen species. The biogeographic implications of their work, which for all five Sulawesi species are very interesting, are noted briefly in the introductory section, under "cladistic analysis."

Foodplants.— Urticaceae.

Key works.— Holloway (1973), Tsukada (1985), Corbet & Pendlebury (1992), Parsons (1999), Fric *et al.* (submitted).

S. lilaea Hewitson, 1864

(Common Jester)

Range (2+5+6+7).— Northern India, China, Thailand, Malay Peninsula, Sumatra, Java, Bali, Lombok, Borneo, Philippines (excluding Palawan), Sulawesi.

Foodplants.— *Boehmeria, Debregeasia, Girardinia* (Urticaceae). Bascombe *et al.* (1999) illustrate all life stages (Hong Kong).

— **S. lilaea utakata* Tsukada & Nishiyama, 1985

Range.— Sulawesi.

S. hippoclus Cramer, 1779

Range (W).— Thailand, Malay Peninsula, Sumatra, western Lesser Sunda Islands,

Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Boehmeria, Debregeasia, Girardinia, Oreocnide, Pipturus* (Urticaceae). Igarashi & Fukuda (1997) illustrate all life stages (Malaya).

— **S. hippoclus clausus* Fruhstorfer, 1904

Range.— Sulawesi (N, C), Buton, Kabaena, Kep. Togian.

— **S. hippoclus confluens* Fruhstorfer, 1896

Range.— Sulawesi (S).

— **S. hippoclus centho* Fruhstorfer, 1904

Range.— Kep. Banggai (Peleng), Kep Sula (Mangole, Sanana).

**S. platena* Staudinger, 1896

Range (E).— Sulawesi (C).

**S. hippalus* Felder & Felder, 1867
(Pl. 14, figs 7, 11)

Range (E).— Sulawesi.

**S. intricata* Fruhstorfer, 1897
(Pl. 14, fig. 6 — Fancy Jester)

Range (E).— Sulawesi (N).

Vanessa Fabricius, 1807
(admirals, painted ladies — Pl. 14, fig. 10)

Range (1+2+5+6+7).— Generally regarded as "cosmopolitan", but not recorded from Maluku, and only recently positively recorded from Borneo (see below). This extremely familiar group of butterflies, which includes a total of 13 species divisible amongst three subgenera, is represented on Sulawesi by a single endemic restricted to Mt Lompobatang.

Foodplants.— Apiaceae, Asteraceae, Balsaminaceae, Boraginaceae, Cannabidaceae, Chenopodiaceae, Fabaceae, Geraniaceae, Lamiaceae, Malvaceae, Oleaceae, Salicaceae, Scrophulariaceae, Smilacaceae, Tiliaceae, Ulmaceae, Urticaceae.

Key works.— Field (1971), Tsukada (1985), Teshirogi (1990).

Vanessa (Vanessa) Fabricius, 1807

Range.— North and Central America, Hawaii, Palaearctic Region, Oriental Region, including the Philippines (Treadaway, in litt.), Sulawesi, and the Lesser Sunda Islands; the subgenus does not occur in Maluku or further east into New Guinea, and is only recently confirmed for Borneo: *V. cardui* Linnaeus was mapped for Borneo by Tsukada (1985: 302), but not listed by Field (1971) or Otsuka (1988), nor is there any authentic material in BMNH; Otsuka (1991), however, has now positively recorded it from West Kalimantan.

Foodplants.— Asteraceae (*Ambrosia, Ammobium, Bracteantha, Carduus, Chrysocephalum, Cirsium, Helichrysum, Gnaphalium, Rhodanthe*), Cannabidaceae (*Humulus*), Lamiaceae (Braby, 2000), Malvaceae (Braby, 2000), Salicaceae (*Populus, Salix*),

Tiliaceae (*Corchorus*), Ulmaceae (*Ulmus*), Urticaceae (*Boehmeria, Girardinia, Neraudia, Parietaria, Pipturus, Soleirolia, Touchardia, Urera, Urtica*).

**V. (V.) buana* Fruhstorfer, 1898
(Lompobatang Lady — Pl. 14, fig. 10)

Range (E).— Sulawesi (S).

***Kaniska* Moore, 1899**
(admirals — Pl. 14, fig. 3)

Range (2+6+7).— Sri Lanka, India, Indo-China, China, Korea, Japan, Malay Peninsula, Sumatra, Java, Borneo, Philippines (Luzon, Mindoro, Panay and Mindanao only: Treadaway, 1995), Sulawesi. This beautiful monobasic genus has often been considered closely related to the Holarctic *Polygonia* and *Nymphalis*, but Nakanishi (1988), Teshirogi (1990), Yoshimoto (2001) and Nylin *et al.* (2001) all demonstrate that, although close, it is sufficiently distinct to justify continuing separation.

Foodplants.— ?Dioscoreaceae, Liliaceae, Smilacaceae. Teshirogi (1990) (Japan) and Bascombe *et al.* (1999) (Hong Kong) illustrate all life stages.

Key works.— Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

K. canace Linnaeus, 1763
(Blue Admiral — Pl. 14, fig. 3)

Range (2+6+7).— as genus.

Foodplants.— ?Dioscoreaceae; *Lilium, Streptopus, Tricyrtis* (Liliaceae); *Heterosmilax, Smilax* (Smilacaceae).

— **K. canace muscosa* Tsukada & Nishiyama, 1979

Range.— Sulawesi (C).

Kallimini Doherty, 1886
(pansies, buckeyes, egg-flies, leafwings — Pl. 14, figs 2, 4, 8, 9, 12)

Range.— A mainly pantropical group, numbering well over 100 species. Five of the approximately 16 genera occur in the Sulawesi Region.

Foodplants.— Largely as subfamily.

Key works.— As subfamily.

***Junonia* Hübner, 1819**
(pansies, soldiers, buckeyes — Pl. 14, fig. 4)

Range (W).— Cosmopolitan, except for western Palaearctic.

The nominal genera *Junonia* and *Precis* Hübner, together up to 40 or more species, are seen as closely related, yet separate genera by many authors, based largely on differences in the male genitalia. Van Son (1979) strongly advocated treating them as no more than subgenera. However, a recent analysis based on one mitochondrial and two nuclear genes (COI, wingless and EF1α), although confirming the monophyly of the two genera, strongly indicates that they are not sister to each other, *Precis* being

sister to *Hypolimnas*, while *Junonia* is sister to a group of three other, African genera (Wahlberg, pers. comm.). *Precis* is restricted to Africa. Five species of *Junonia* occur on Sulawesi.

Foodplants.— Mainly Acanthaceae, Lamiaceae, Onagraceae, Poaceae, Scrophulariaceae, Verbenaceae, Violaceae.

Key works.— Common & Waterhouse (1981), Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

J. hedonia Linnaeus, 1764
(Brown Soldier, Chocolate Argus)

Range (W).— Malay Peninsula, Sumatra, Java, western Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, Solomon Islands, Australia.

Foodplants.— *Blechum, Hemigraphis, Hygrophila, Ruellia* (Acanthaceae), *Sida* (Malvaceae: Parsons, 1999). Parsons (1999) illustrates the pupa (Papua New Guinea). Braby (2000) describes life cycle and behaviour.

— **J. hedonia intermedia* Felder & Felder, 1867 (= *permagna* Martin, 1920)

Range.— Sulawesi, Kep. Sangihe (Siao), Salayar, Kabaena, Buton, Kep. Banggai (Peleng).

— *J. hedonia ida* Cramer, 1775

Range.— Malay Peninsula, Sumatra, Java, Bali, Bawean, Borneo, Palawan, Philippines, Kep. Talaud (Kaburuang, Karakelong, Salebabu), Kep. Sangihe (Sangihe).

— **J. hedonia teurnia* Fruhstorfer, 1912

Range.— Kep Sula (Mangole, Sanana).

J. atlites Linnaeus, 1763
(Grey Pansy)

Range (W).— Sri Lanka, India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi, Kep. Banggai, N & C Maluku.

Foodplants.— *Asteracantha, Barleria, Blechum* (in captivity: Igarashi & Fukuda, 1997), *Hygrophila, Justicia, Nelsonia, Pseuderanthemum, Strobilanthes* (Acanthaceae); *Achyranthes, Alternanthera* (Amaranthaceae); *Oryza* (Poaceae); *Lindernia* (Scrophulariaceae); *Phyla* (Verbenaceae; in captivity). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).

— **J. atlites acera* Fruhstorfer, 1912

Range.— Sulawesi, Kep. Banggai (Peleng).

J. almana Linnaeus, 1758
(Peacock Pansy)

Range (1+2+5+6+7).— Sri Lanka, India, Indo-China, China, Ryukyu Islands, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo (Otsuka, 1991), Palawan, Philippines, Sulawesi.

Foodplants.— *Acanthus, Asteracantha, Barleria, Blechum, Hemigraphis, Hygrophila, Ruellia, Strobilanthes* (Acanthaceae); *Alternanthera* (Amaranthaceae); *Mimosa* (Fabaceae); *Gloxinia* (Gesneriaceae); *Osbeckia* (Melastomataceae); *Ludwigia* (Onagraceae); *Plan-*

tago (Plantaginaceae); *Antirrhinum*, *Bonnaya, Ilysanthes, Lindernia, Mimulus* (Scrophulariaceae); *Lippia, Phyla,* ?*Stachytarpheta* (Verbenaceae). Teshirogi (1990) (Japan) and Igarashi & Fukuda (1997) (Malaya) illustrate all life stages, as do Bascombe *et al.* (1999) (Hong Kong).

— **J. almana battana* Fruhstorfer, 1906

Range.— Sulawesi (C, S), Salayar, Buton, Kep. Tukangbesi (Kaledupa).

J. erigone Cramer, 1779
(Northern Argus)
(Pl. 14, fig. 4)

Range (3+4+5+6).— Java, Lesser Sunda Islands, Sulawesi Region, N & C Maluku, New Guinea, just reaching Wessel Islands, northern Australia (Braby, 2000).

— *J. erigone gardineri* Fruhstorfer, 1902

Range.— Sulawesi (C, S), Salayar, Buton, Kabaena, Kep. Tukangbesi (Tomea), central Maluku.

J. timorensis Wallace, 1869

Range (P).— Lesser Sunda Islands, Kalao.

— **J. timorensis kucil* Tsukada & Kaneko, 1985

Range.— Kalao.

J. orithya Linnaeus, 1758
(Blue Pansy, Blue Argus)

Range (W).— Afrotropical Region, Sri Lanka, southern India, northern India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Australia.

Foodplants.— *Acanthus, Asystasia, Barleria, Brunoniella, Hygrophila, Hypoestes, Justicia, ?Lepidagathis, Pseuderanthemum , Rostellularia* (Acanthaceae); *Ipomoea* (Convolvulaceae); *Englerastrum, Plectranthus* (Lamiaceae); *Plantago* (Plantaginaceae); *Angelonia, Antirrhinum, Buchnera, Misopates, Scrophularia, Striga* (Scrophulariaceae); *Thunbergia* (Thunbergiaceae); *Lippia, Phyla* (Verbenaceae); *Viola* (Violaceae). Teshirogi (1990) (Japan) and Igarashi & Fukuda (1997) (Malaya) illustrate all life stages, as do Bascombe *et al.* (1999) (Hong Kong).

— **J. orithya kontinentalis* Martin, 1920

Range.— Sulawesi (N, C).

— *J. orithya celebensis* Staudinger, 1888

Range.— Sulawesi (C, S), Muna. Otsuka (1991) considers that material from Balikpapan, eastern Kalimantan, also belongs to this subspecies.

— **J. orithya saleyra* Fruhstorfer, 1912

Range.— Salayar.

— *J. orithya kuehni* Fruhstorfer, 1904

Range.— Lesser Sunda Islands, Kalao, Kep. Tukangbesi (Kaledupa, Tomea, Binongko).

— *J. orithya orthosia* Godart, 1823

Range.— Kep. Sula (Sanana), central Maluku.

Yoma Doherty, 1886
(lurchers — Pl. 14, fig. 8)

Range (W).— Burma, Indo-China, southern China, Malay Peninsula, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, northern Australia, Vanuata and New Caledonia. Two species, apparently sympatric in parts of New Guinea (Parsons, 1999).

Foodplants.— Acanthaceae.

Key works.— Common & Waterhouse (1981), Tsukada (1985), Parsons (1999).

Y. sabina Cramer, 1780
(The Lurcher, Australian Lurcher — Pl. 14, fig. 8)

Range (W).— Burma, Indo-China, southern China, Malay Peninsula, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, northern Australia, Vanuata and New caledonia.

Foodplants.— *Dipteracanthus, Hemigraphis* (Parsons, 1999), *Ruellia*, also *Blechum* and *Glendarussa* in captivity (all Acanthaceae); Igarashi & Fukuda (2000) illustrate all life stages (Maluku).

— **Y. sabina nimbus* Tsukada, 1985

Range.— Sulawesi, Muna, Kalao, Kep. Tukangbesi (Kaledupa), Kep. Togian (Waleabahi), Kep. Banggai (Peleng), Kep. Sula (Sanana).

— **Y. sabina magnus* Tsukada, 1985

Range.— Kep. Talaud (Maburuan).

Rhinopalpa Felder & Felder, 1860
(wizards — Pl. 14, fig. 9)

Range (2+6+7).— Assam, Thailand, Malay Peninsula, Sumatra, Java, Bali, Borneo, Philippines (excluding Palawan), Sulawesi (monobasic).

Foodplants.— Cecropiaceae, Urticaceae.

Key works.— Tsukada (1985), Corbet & Pendlebury (1992).

R. polynice Cramer, 1779
(The Wizard — Pl. 14, fig. 9)

Range (2+6+7).— As genus.

Foodplants.— *Poikilospermum* (Cecropiaceae); *Conocephalus, Dendrocnide, Poikilospermum* (Urticaceae). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).

— **R. polynice megalonice* Felder & Felder, 1867

Range.— Sulawesi.

Hypolimnas Hübner, 1819
(diadems, egg-flies — Pl. 14, fig. 12)

Range (W).— Palaeotropics, with slight extension into Neotropical Region. A genus of about 30 species, some half of which occur in the Indo-Australian tropics. Only three occur in Malaysia, whereas seven are recorded from the Sulawesi Region.

Foodplants.— Acanthaceae, Amaranthaceae, Arecaceae, Asclepiadaceae, Asteraceae, Commelinaceae, Convolvulaceae, Crassulaceae, Fabaceae, Lamiaceae, Malvaceae, Moraceae, Plantaginaceae, Polygonaceae, Portulacaceae, Rubiaceae, Tiliaceae, Urticaceae.

Key works.— Vane-Wright *et al.* (1977), Common (1978), Common & Waterhouse (1981), Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

**H. dimona* Fruhstorfer, 1913

Range (L).— Kep. Sula (Mangole).

**H. diomea* Hewitson, 1861

Range (R).— Sulawesi Region.

Foodplants.— *Elatostema lineolatum* (Urticaceae); see Teshirogi (2001), who also illustrates egg, larva and pupa.

— *H. diomea diomea* Hewitson, 1861

Range.— Sulawesi (N, C, SE), Buton.

— **H. diomea fraterna* Wallace, 1869

Range.— Sulawesi (S).

— **H. diomea sororia* Hall, 1930

Range.— Kep. Sangihe.

— **H. diomea serica* Tsukada, 1985

Range.— Kabaena.

H. anomala Wallace, 1869

(Malayan Egg-fly, Crow Egg-fly — Pl. 14, fig. 12)

Range (1+2+5+6+7).— Guam (Schreiner & Nafus, 1991), southern Japan, Ryukyu Islands, southern China (rare: Bascombe *et al.*, 1999), Taiwan, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region; recorded twice from extreme northern Australia (Common & Waterhouse, 1981).

Foodplants.— *Claoxylon* (Euphorbiaceae); *Pipturus, Pouzolzia, Villebrunea* (Urticaceae). Teshirogi (1990) illustrates the egg, first, second and fifth instars and the pupa (Japan). Igarashi & Fukuda (1997) illustrate the larva and pupa (Philippines). Bascombe *et al.* (1999) illustrate the remarkable egg-guarding behaviour of this species (Schreiner & Nafus, 1991).

— **H. anomala stellata* Fruhstorfer, 1912

Range.— Sulawesi (N, C, S), Buton, Kabaena, Kep. Banggai (Peleng), Kep. Sula (Sanana).

— *H. anomala anomala* Wallace, 1869

Range.— Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Kep. Sangihe.

H. antilope Cramer, 1777

Range (P).— Kep. Talaud, Kep. Sangihe, N & C Maluku, New Guinea region, Solomon Islands, New Caledonia, Fiji, Samoa.

Foodplants.— *Asystasia, Graptophyllum, Pseuderanthemum* (Acanthaceae); *Oreocnide*, *Pipturus* (Urticaceae: Parsons, 1999).

— **H. antilope phalkes* Fruhstorfer, 1908
Range.— Kep. Talaud (Karakelong, Salebabu), Kep. Sangihe (Siao).
— *H. antilope antilope* Cramer, 1777
Range.— Kep. Sula (Mangole, Sanana), Maluku.

H. bolina Linnaeus, 1758
(Great Egg-fly, Varied Egg-fly)

Range (W).— ?Kenya, Madagascar, Socotra, Sri Lanka, India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, Australia, Pacific region.

Foodplants.— *Asystasia, Dipteracanthus, Justicia, Pseuderanthemum, Rostellularia, Ruellia, Systasia* (Acanthaceae); *Alternanthera* (Amaranthaceae); *Eclipta, Synedrella* (Asteraceae); *Commelina* (Commelinaceae); *Ipomoea, Merremia* (Convolvulaceae); *Desmodium, Phaseolus, Vigna* (Fabaceae); *Perilla* (Lamiaceae); *Abutilon, Malvastrum, Sida* (Malvaceae); *Ficus* (Moraceae); *Polygonum, Persicaria* (Polygonaceae); *Portulaca* (Portulacaceae); *Richardia* (Rubiaceae); *Triumfetta* (Tiliaceae); *Boehmeria, Elatostema, Fleurya, Laportea, Pipturus, Urtica* (Urticaceae). Teshirogi (1990) (Japan) and Igarashi & Fukuda (1997) (Philippines) illustrate all life stages, as do Bascombe *et al.* (1999) (Hong Kong).
— *H. bolina bolina* Linnaeus, 1758 (= *celebensis* Fruhstorfer)
Range.— Sumatra, Java, Lesser Sunda Islands, western Borneo, Sulawesi, Salayar, Kabaena, Galla, Kep. Banggai (Peleng), Kep. Sula, northern Maluku, New Guinea region, Solomon Islands, Australia, New Caledonia (distribution based on Fukuda & Nicho, 1988).

Note.— The "correct" subspecies is open to doubt; Parsons (1999) placed all New Guinea populations as *H. b. nerina* Fabricius; Peggie *et al.* (in litt.) applied the name *H. b. lisianassa* Cramer to both northern and central Maluku populations.
— **H. bolina gigas* Oberthür, 1879
Range.— Kep. Sangihe (Sangihe).

H. alimena Linnaeus, 1758
(Blue-banded Egg-fly)

Range (P).— Eastern Lesser Sunda Islands, Kep. Talaud, ?Kep. Banggai, Kep. Sula, Maluku, New Guinea region, Solomon Islands, New Caledonia, Australia.

Foodplants.— *Asystasia, Graptophyllum, Pseuderanthemum* (Acanthaceae), *Sida* (Malvaceae: Parsons, 1999), *Pipturus* (Urticaceae: Parsons, 1999). Braby (2000) describes eggs and larvae.
— **H. alimena talauta* Fruhstorfer, 1912
Range.— Kep. Talaud.
— *H. alimena alimena* Linnaeus, 1758
Range.— ?Kep. Banggai (Peleng; Nieuwenhuis, 1946), Kep. Tukangbesi (Wangiwangi and Lintea: Ohnishi & Sugimoto, 1998), Kep. Sula (Mangole), N & C Maluku, New Guinea, Australia.

H. misippus Linnaeus, 1764
(Danaid Egg-fly)

Range (W).— Antilles, northern South America, and throughout Afrotropical,

Oriental and Australian Regions, including Sulawesi, Muna and N & C Maluku.

Foodplants.— *Asystasia, Barlesia, Blepharis, Justicia, Pseuderanthemum, Ruellia* (Acanthaceae); *Amaranthus* (Amaranthaceae); *Eleais* (Arecaceae); *Batatas (=Ipomoea)* (Convolvulaceae); *Abelmoschus, Abutilon, Gossypium, Hibiscus* (Malvaceae); *Ficus*? (Moraceae); *Plantago* (Plantaginaceae); *Portulaca, Talinum* (Portulacaceae); *Elatostema* (Urticaceae). The life history was extensively described and early stages illustrated in Van Son (1979). Teshirogi (1990) also illustrates all life stages.

Doleschallia Felder & Felder, 1860

(leafwings, autumn leaves — Pl. 14, fig. 2)

Range (W).— Oriental and Australian Regions. A genus of about 10 species, most richly developed in the New Guinea region. Sulawesi has a single representative.

Foodplants.— Acanthaceae, Calycanthaceae, Fabaceae, Moraceae, ?Rubiaceae, Urticaceae.

Key works.— Common & Waterhouse (1981), Tsukada (1985), Corbet & Pendlebury (1992), Parsons (1999).

D. polibete Cramer, 1782

(Australian Leafwing — Pl. 14, fig. 2)

Range (3+4+5+6).— Java, Lesser Sunda Islands, Sulawesi Region, N & C Maluku, New Guinea (where it is locally sporadic: Parsons, 1999) and Australia (*D. polibete australis*, Felder & Felder). *Doleschallia* butterflies from the Solomons, New Caledonia, Vanuatu and Fiji formerly included in *D. bisaltide* or *D. polibete*, are now placed by Parsons (1999) as a separate species, *D. tongana* Hopkins, 1927.

Foodplants.— *Asystasia, Graptophyllum, Pseuderanthemum, Strobilanthes* (Acanthaceae).

— **D. polibete celebensis* Fruhstorfer, 1899

Range.— Sulawesi, Kep. Talaud (Karakelong), Kep. Togian (Dolong), Salayar, Buton, Galla, Kalao.

— **D. polibete maturitas* Tsukada, 1985

Range.— Kep. Banggai (Peleng).

— **D. polibete sulaensis* Fruhstorfer, 1899

Range.— Kep. Sula (Mangole, Sanana).

Danainae Boisduval, 1833

(milkweeds, crows, tigers, glasswings — Pl. 15, figs 6-10, Pl. 16)

Range.— Cosmotropical, extending weakly into temperate Nearctic and Palaearctic Regions. About 60 genera containing over 450 species divided into three tribes, one of which is confined to the New Guinea region (Tellervini), and one to the Neotropics (Ithomiini). The third is well represented in the Malay Archipelago, and is especially diverse on Sulawesi.

Foodplants.— Primarily Apocynaceae, Asclepiadaceae, Moraceae and Solanaceae.

Status.— Several species are on the IUCN red list of threatened animals; their status is given following Baillie & Groombridge (1996).

Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Kitching (1985), Ackery (1987, 1988), Kitching *et al.* (1993), Ackery *et al.* (1999), Brower (2000).

Danaini Boisduval, 1833

(milkweeds, monarchs, tigers, crows, ghosts — Pl. 15, figs 6-10, Pl. 16)

Range.— Cosmotropical, extending weakly into temperate Nearctic, Neotropical and Palaearctic Regions. Twelve genera containing over 150 species divided into two subtribes, both well represented in the Indo-Australian tropics.

Foodplants.— Primarily Apocynaceae, Asclepiadaceae and Moraceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Ackery *et al.* (1999), Brower (2000), Vane-Wright *et al.* (2002).

Danaina Boisduval, 1833

(milkweeds, monarchs, queens, tigers, wood nymphs — Pl. 15, figs 6-10)

Range.— As subfamily. Two subgroups, both represented in Sulawesi, the first by two of the four genera (*Parantica* and *Ideopsis*), the second by two of the three genera (*Danaus* and *Tirumala*).

Foodplants.— Primarily Apocynaceae and Asclepiadaceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Vane-Wright *et al*. (2002).

***Parantica* Moore, 1880**

(tigers — Pl. 15, fig. 10)

Range (W).— Oriental, Australian and eastern Palaearctic Regions. A genus of about 40 species, richly represented on Sulawesi by seven or even eight species. Four (possibly five) of them belong to the entirely endemic *kuekenthali*-group (*kuekenthali, toxopei, dabrerai, hypowattan*). The southern endemic *sulewattan* belongs to a small group otherwise restricted to the Lesser Sunda Islands, while the Sulawesi Region endemic, *menadensis*, is related to a large group of Indo-Philippine-Sundanian species. The only local *Parantica* which extends outside the Sulawesi Region is *cleona*, found also in Maluku; *cleona* forms a group with *aspasia*, found from Indo-China to Palawan and Sumbawa.

Status.— Five of the endemic species are on the IUCN red list of threatened animals (Baillie & Groombridge, 1996). Their status is given below.

Foodplants.— Mainly Asclepiadaceae (*Calotropis, Ceropegia, Cynanchum, Gymnema, Hoya, Marsdenia, Metaplexis, Tylophora*), *Parsonsia* (Apocynaceae: Parsons, 1999), Periplocaceae (*Cryptolepis*).

Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Vane-Wright *et al*. (2002).

P. cleona Stoll, 1782

(Eastern Yellow Glassy Tiger)

Range (3+4).— Sulawesi Region, N & C Maluku and Kep. Kai.

Foodplants.— *Gymnema tingens* (Asclepiadaceae), recorded by Igarashi & Fukuda (2000), who also illustrate all life stages.

— **P. cleona luciplena* Fruhstorfer, 1892
Range.— Sulawesi, Salayar, Wowoni, Buton, Kep. Banggai (Peleng).

— **P. cleona talautica* Snellen, 1896
Range.— Kep. Talaud.

— **P. cleona lucida* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole).

**P. sulewattan* Fruhstorfer, 1896
(Bonthain Tiger — Pl. 15, fig. 10)
Range (E).— Sulawesi (S).
Status.— endangered (Baillie & Groombridge, 1996).

**P. toxopei* Nieuwenhuis, 1969
(Toxopeus' Tiger)
Range (E).— Sulawesi (C).
Status.— Vulnerable (Baillie & Groombridge, 1996).

**P. kuekenthali* Pagenstecher, 1896
(Kuekenthal's Tiger)
Range (E).— Sulawesi (N).
Status.— Endangered (Baillie & Groombridge, 1996).

**P. dabrerai* Miller & Miller, 1978
(d'Abrera's Tiger)
Range (E).— Sulawesi (C).
Status.— Vulnerable (Baillie & Groombridge, 1996).

**P. hypowattan* Morishita, 1981
(Morishita's Tiger)
Range (E).— Sulawesi (C).
Status.— Vulnerable (Baillie & Groombridge, 1996).

**P.* sp. (Zoological Museum, Amsterdam)
Range (E).— Sulawesi (no more precise data). As noted by Ackery & Vane-Wright (1984), a single female belonging to the Zoological Museum, Amsterdam, appears to represent a fifth species of the *kuekenthali*-group.

**P. menadensis* Moore, 1883
(Manado Tiger)
Range (R).— Sulawesi Region.
Status.— Listed as threatened and rare in 1994 (Groombridge, 1994), but removed from the red list in 1996 (Baillie & Groombridge, 1996).

— **P. menadensis menadensis* Moore, 1883
Range.— Sulawesi (N).

— **P. menadensis niuwenhuisi* Detani, 1983
Range.— Kep. Banggai (Peleng).
— **P. menadensis* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kep. Sula (Mangole).

Ideopsis Horsfield, 1858
(wood nymphs, tigers — Pl. 15, fig. 6)

Range (W).— Sri Lanka, Indo-China, Malay Peninsula, Nicobar islands, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines, Sulawesi Region, Maluku, New Guinea eastwards to the Solomon Islands. A genus of 'difficult' butterflies still requiring considerable work to arrive at meaningful species limits. The two species found in Sulawesi are, however, extremely easy to separate from each other, representing the two major clades (each with four currently recognised species) into which *Ideopsis* can confidently be divided.

Foodplants.— Mainly Apocynaceae, Asclepiadaceae, also Cardiopteridaceae, ?Piperaceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984).

I. juventa Cramer, 1777
(Young Tiger — Pl. 15, fig. 6)

Range (W).— Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, western Lesser Sunda Islands and New Guinea eastwards to the Solomon Islands.

Foodplants.— *Cynanchum, Gymnema, Heterostemma* (Parsons, 1999), *Pergularia, Telosma* (Asclepiadaceae); ?*Piper* (Piperaceae). Igarashi & Fukuda (2000) illustrate all life stages (Malaya).

— **I. juventa tontoliensis* Fruhstorfer, 1897
Range.— Sulawesi (N).
— **I. juventa tawaya* Fruhstorfer, 1904
Range.— Sulawesi (C).
— **I. juventa ultramontana* Martin, 1914
Range.— Sulawesi (C).
— **I. juventa ishma* Butler, 1869
Range.— Sulawesi (S, SE - Roos, 1993), Buton, Kabaena, Muna, Kep. Banggai (Peleng).
— **I. juventa lirungensis* Fruhstorfer, 1899
Range.— Kep. Talaud
— **I. juventa satellitica* Fruhstorfer, 1899
Range.— Salayar.
— **I. juventa sequana* Fruhstorfer, 1910
Range.— Kep. Tukangbesi (Tomea, Binongko and Kaledupa).
— **I. juventa homonyma* Bryk, 1937
Range.— Tanahjampea.
— **I. juventa kallatia* Fruhstorfer, 1904
Range.— Kalao.

— **I. juventa lycosura* Fruhstorfer, 1910
Range.— Bonerate.
— **I. juventa sophonisbe* Fruhstorfer, 1904
Range.— Kep. Sula (Mangole, Sanana).

I. vitrea Blanchard, 1853
(Blanchard's Wood Nymph)

Range (3+4).— Sulawesi Region, N & C Maluku (apparently very rare in central Maluku), New Guinea (Irian Jaya). The *gaura* complex, to which *vitrea* belongs, is distributed through Sundaland and Wallacea eastwards only to New Guinea (Vogelkop and Biak); the complex is not represented in the Lesser Sunda Islands.

Foodplants.— *Cardiopteris moluccana* (Cardiopteridaceae, or Icacinaceae) (also *Marsdenia tomentosa* as substitute in captivity), recorded by Igarashi & Fukuda (2000), who also illustrate all life stages.
— **I. vitrea vitrea* Blanchard, 1853
Range.— Sulawesi (N).
— **I. vitrea arachosia* Fruhstorfer, 1910
Range.— Sulawesi (C, S), Buton.
— **I. vitrea ribbei* Röber, 1887
Range.— Kep. Banggai (Peleng).
— **I. vitrea iza* Fruhstorfer, 1898
Range.— Kep. Sula (Taliabu, Mangole, Sanana).

***Tirumala* Moore, 1880**
(blue tigers — Pl. 15, fig. 7)

Range (1+2+4+5+6+7).— Palaeotropics (but not recorded from N Maluku other than Gebe). Another group of 'difficult' species; of the nine currently recognised, two occur in Africa, the others in the Indo-Pacific. The genus is richly represented in Sulawesi by four species.

Foodplants.— Mainly Apocynaceae, Asclepiadaceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984).

T. choaspes Butler, 1886
(Sulawesi Blue Tiger — Pl. 15, fig. 7)

Range (R).— ?extreme southern Philippines, Sulawesi Region.

Note.— the southern Mindanao taxon *tumanana* Semper, also found on the nearby Sarangani Islands, was attributed by Ackery & Vane-Wright (1984) to *choaspes*, but it is placed by Morishita (1981) and by Treadaway (1995) as a disjunct race of *limniace*; it should perhaps be regarded as a distinct species.
— **T. choaspes choaspes* Butler, 1886
Range.— Sulawesi (S).
— **T. choaspes kalawara* Martin, 1913
Range.— Sulawesi (N, C).
— **T. choaspes* subsp. (Roos, 1993)
Range.— Sulawesi (SE).

— **T. choaspes kroeseni* Martin, 1910
Range.— Buton.
— **T. choaspes oxynthas* Fruhstorfer, 1911
Range.— Kep. Sula (Mangole).

T. limniace Cramer, 1775
(The Blue Tiger)

Range (5+6).— Throughout much of the Oriental Region, from Afghanistan to China, Malay Peninsula, Java, ?Borneo, Lesser Sunda Islands, northern and central Philippines (absent from Palawan and perhaps southern Philippines - but see note under *choaspes*), and Sulawesi Region (but absent in north).

Foodplants.— *Holarrhena* (Apocynaceae); *Asclepias, Calotropis, Dregea, Heterostemma, Hoya, Marsdenia, Tylophora* (Asclepiadaceae); *Crotalaria* (Fabaceae); *Epibaterium* (= *Cocculus*) (Menispermaceae). Ackery & Vane-Wright (1984) illustrate all life stages (Hong Kong).
— **T. limniace makassara* Martin, 1910
Range.— Sulawesi (C, S).
— **T. limniace bentenga* Martin, 1910
Range.— Salayar.
— **T. limniace* subsp. (BMNH)
Range.— Tanahjampea.
— **T. limniace conjuncta* Moore, 1883
Range.— Kalao.
— **T. limniace ino* Butler, 1871
Range.— Kep. Sula (Mangole, Sanana).

T. hamata Macleay, 1827
(Dark Blue Tiger, Blue Wanderer)

Range (1+2+4+5+6).— Java, Lesser Sunda Islands, Philippines (apparently including Palawan: Treadaway, 1995), Hong Kong, Sulawesi Region, C Maluku, Gebe, New Guinea region, Solomon Islands, Fiji, Tonga, Samoa, New Caledonia, Australia, New Zealand.

Foodplants.— *Parsonsia* (Apocynaceae); *Cynanchum, Heterostemma, Hoya, Leichardtia?, Marsdenia, Secamone, Tylophora* (Asclepiadaceae); *Cryptostegia* (Periplocaceae).
— **T. hamata goana* Martin, 1910
Range.— Sulawesi (S).
— **T. hamata talautensis* Talbot, 1943
Range.— Kep. Talaud.
— **T. hamata arikata* Fruhstorfer, 1910
Range.— Kep. Sula (Mangole, Sanana).

T. ishmoides Moore, 1883
(Uncertain Blue Tiger)

Range (2+5+6).— Java, Lesser Sunda Islands (Sumba), Philippines (absent from Palawan), Sulawesi Region. The validity of the collective taxon remains open to doubt.

Foodplants.— ?*Parsonsia* sp. (Apocynaceae).

— **T. ishmoides ishmoides* Moore, 1883
Range.— Sulawesi, Bangka, Muna, Kep. Banggai.

Danaus Kluk, 1802
(monarchs, queens, tigers — Pl. 15, figs 8, 9)

Range (W).— As subfamily. The 11 species are divided amongst three subgenera, all represented in Sulawesi.
Foodplants.— Mainly Asclepiadaceae.
Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Kitching *et al.* (1993).

Danaus (Danaus) Kluk, 1802

Range.— As subfamily. The three species are all American but *plexippus*, the famous Monarch butterfly, spread across the Atlantic and Pacific oceans during the 19th century (Vane-Wright, 1993a); it was first recorded from Sulawesi by Semper (1873).
Foodplants.— Mainly Asclepiadaceae.

D. (D.) plexippus Linnaeus, 1758
(The Monarch, Milkweed, Wanderer, Black-veined Brown)
Range (3+4+5).— As subfamily but absent from the Afrotropical Region (except Mauritius), the Indian subcontinent, Malay Peninsula and islands of the Sunda Shelf (formerly recorded in Borneo and the Philippines, but apparently extinct there now).
Foodplants.— *Apocynum?* (Apocynaceae); *Acerates, Araujia, Asclepias, Calotropis, Gomphocarpus, Gonolobus, Marsdenia, Matelea, Oxypetalum, Stapelia* (Asclepiadaceae); *Ipomoea* (Convolvulaceae). Igarashi & Fukuda (1997) illustrate all life stages (Hawaii).
— *D. (D.) plexippus plexippus* Linnaeus, 1758
Range.— Northern and central America, Antilles, Azores, Canary Islands, Spain, Mauritius, Réunion, Polynesia, Micronesia, New Caledonia, New Zealand, Solomon Islands, Australia, New Guinea region, eastern Lesser Sunda Islands, N & C Maluku, northern Sulawesi (Semper, 1873; Morishita, 1981), Philippines (material in BMNH; apparently extinct), ?Borneo (probably extinct), Taiwan, and southern China (probably extinct: Bascombe *et al.*, 1999).

Danaus (Salatura) Moore, 1880

Range.— Oriental and Australian Regions. Four species, all represented on Sulawesi.
Foodplants.— Asclepiadaceae.

D. (S.) ismare Cramer, 1780
(Wallacean Tiger)
Range (3+4).— Sulawesi Region, N & C Maluku.
— **D. (S.) ismare alba* Morishita, 1981
Range.— Sulawesi (N), Kep. Sangihe (Sangihe, Siao), Kep. Talaud.
— **D. (S.) ismare fulvus* Ribbe, 1890
Range.— Sulawesi (C, S), Kabaena.

— **D. (S.) ismare* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kep. Banggai (Peleng).

D. (S.) genutia Cramer, 1779
(Common Tiger, Orange Tiger, Dark Veined Tiger — Pl. 15, fig. 8)

Range (1+2+5+6+7).— Sri Lanka, northern India, Indo-China, China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, north-western Australia (absent from Maluku and New Guinea).

Foodplants.— *Asclepias, Ceropegia, Cynanchum, Graphistemma, Gymnema, Marsdenia, Pergularia, Raphistemma, Sarcostemma, Stephanotis, Tylophora* (Asclepiadaceae). Igarashi & Fukuda (2000) illustrate all life stages (Laos), as do Ackery & Vane-Wright (1984) and Bascombe *et al.* (Hong Kong).

— **D. (S.) genutia leucoglene* Felder & Felder, 1865
Range.— Sulawesi.
— **D. (S.) genutia telmissus* Fruhstorfer, 1910
Range.— Buton, Kabaena, Muna.
— **D. (S.) genutia tychius* Fruhstorfer, 1910
Range.— Salayar.
— **D. (S.) genutia* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kep. Tukangbesi.

D. (S.) affinis Fabricius, 1775
(Malay Tiger, Swamp Tiger)

Range (3+4+5+6).— Thailand, Malay Peninsula, Java, Lesser Sunda Islands, Philippines (Luzon, Mindoro and Marinduque only: Treadaway, 1995), Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, Australia, Vanuatu and New Caledonia.

Foodplants.— *Cynanchum, Heterostemma* (Parsons, 1999), *Ischnostemma, Tylophora, Vincetoxicum* (Asclepiadaceae). Ackery & Vane-Wright (1984) illustrate the larva and pupa (Australia).

— **D. (S.) affinis fulgurata* Butler, 1866
Range.— Sulawesi, Kep. Sangihe (Siao), Bangka.
— **D. (S.) affinis taruna* Fruhstorfer, 1899
Range.— Kep. Sangihe (Sangihe), Kep. Kawio (Marore).
— **D. (S.) affinis affinoides* Fruhstorfer, 1899
Range.— Kep. Talaud.
— **D. (S.) affinis wentholti* Martin, 1914
Range.— Salayar.
— **D. (S.) affinis* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kep. Tukangbesi (Binongko).
— **D. (S.) affinis djampeana* Van Eecke, 1915
Range.— Tanahjampea, Kalao.
— **D. (S.) affinis hegesippinus* Röber, 1891
Range.— Bonerate.
— **D. (S.) affinis* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kabaena.

— **D. (S.) affinis decentralis* Fruhstorfer, 1899
Range.— Kep. Banggai (Peleng), Kep. Sula (Mangole, Sanana).

D. (S.) melanippus Cramer, 1777
(White Tiger)

Range (1+2+5+6+7).— North-eastern India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi. The Sulawesi races of *melanippus* are pale, largely white, like those found in the Philippines and Borneo, quite unlike the dark orange or olivaceous races found in Java and the Lesser Sunda Islands.

Foodplants.— *Gymnema, Tylophora* (Asclepiadaceae). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).

— **D. (S.) melanippus celebensis* Staudinger, 1889
Range.— Sulawesi (N).

— **D. (S.) melanippus meridionigra* Martin, 1913
Range.— Sulawesi (C).

Danaus (Anosia) Hübner, 1816

Range.— Nearctic, Neotropical, Afrotropical, Oriental and Australian Regions, extending weakly into the Pacific and southern Palaearctic. Three of the four species are exclusively American, while the fourth is very widely distributed in the Old World.

Foodplants.— Mainly Asclepiadaceae.

D. (A.) chrysippus Linnaeus, 1758
(Plain Tiger, African Queen, Lesser Wanderer — Pl. 15, fig. 9)

Range (W).— Palaeotropics, westwards to the Cape Verde Islands, eastwards to New Zealand, and northwards to the southern Palaearctic.

Foodplants.— *Asclepias, Aspidoglossum* (=*Schizoglossum*), *Brachystelma, Calotropis, Caralluma, Ceropegia, Cynanchum, Gomphocarpus, Huernia, Ischnostemma, Kanahia, Leichardtia, Leptadenia, Marsdenia, Metaplexis, Pachycarpus, Pentarrhinum, Pentatropis, Pergularia, Pleurostelma, Raphistemma, Rhyncharrhena, Sarcostemma, Schizoglossum, Secamone, Stathmostelma, Stapelia, Tylophora* (Asclepiadaceae); *Ipomoea* (Convolvulaceae); *Euphorbia* (Euphorbiaceae), *Periploca* (Periplocaceae), *Dyerophytum* (Plumbaginaceae), *Erioglossum* (Sapindaceae). Igarashi & Fukuda (1997) illustrate all life stages (Malaya), as do Bascombe *et al.* (1999) (Hong Kong).

— *D. (A.) chrysippus chrysippus* Linnaeus, 1758
Range.— Mediterranean, NE Spain, North Africa (Tennent, 1996b), Middle East, Indian subcontinent, China, Malay Peninsula, Sumatra, Borneo, Palawan, Philippines, Kep. Sangihe, Kep. Talaud, Sulawesi (N).

— **D. (A.) chrysippus gelderi* Snellen, 1891
Range.— Sulawesi (C, S, SE).

— *D. (A.) chrysippus bataviana* Moore, 1883
Range.— Java, Lesser Sunda Islands (to Flores), Salayar, Tanahjampea, Kalao, Kep. Banggai (Peleng).

— **D. (A.) chrysippus* subsp. (Hopffer, 1874; Ackery & Vane-Wright, 1984)
Range.— Kep. Togian.

— **D. (A.) chrysippus* subsp. (Ackery & Vane-Wright, 1984)
Range.— Bonerate.
— **D. (A.) chrysippus* subsp. (Jurriaanse & Lindemans, 1920)
Range.— Kep. Tukangbesi.
— **D. (A.) chrysippus* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kabaena.
— *D. (A.) chrysippus cratippus* Felder, 1860
Range.— ?Kep. Sula, N & C Maluku.

Euploeina Moore, 1880
(crows, tree nymphs, ghosts — Pl. 16)

Range.— Cosmotropical, except for the whole of Africa and Madagascar. Two subgroups, one in the New World (two genera), one in the Old (three genera). In latter group the butterflies range from the Indian Ocean (Seychelles, Mascarenes) to the Pacific. Two of these genera are represented on Sulawesi; the third (*Protoploea*) is monobasic, and restricted to New Guinea.

Foodplants.— Mainly Apocynaceae, Asclepiadaceae and Moraceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984).

***Euploea* Fabricius, 1807**
(crows — Pl. 16, fig. 1)

Range (W).— Oriental, Australian and Pacific Regions, extending westwards to include the Seychelles and Mascarene Islands. The largest genus of Danainae, with more than 50 species, 14 of which occur in the Sulawesi Region. Cladistic resolution of this potentially rich source of biogeographic data remains weak, and it is difficult to conclude much from the Euploeas at present. The most remarkable *Euploea* species on Sulawesi is *E. magou*, which appears to represent a stem lineage.

Foodplants.— As tribe.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984).

**E. magou* Martin, 1912
(Magou Crow — Pl. 16, fig. 1)

Range (E).— Sulawesi (C).

Status.— Vulnerable (Baillie & Groombridge, 1996).

E. sylvester Fabricius, 1793
(Two-brand Crow, Double-banded Black Crow)

Range (W).— Sri Lanka, southern India, north-eastern India, Indo-China, Hong Kong (rare: Bascombe *et al*., 1999), Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea, Australia.

Foodplants.— *Ichnocarpus, Parsonsia* (Apocynaceae); *Cynanchum,* ?*Gymnema* (see Braby, 2000), *Hoya, Marsdenia* (Asclepiadaceae); *Ficus* (Moraceae). Parsons (1999) illustrates the pupa (Papua New Guinea), and Braby (2000) describes eggs and larvae (Australia).

— **E. sylvester schlegelii* Felder & Felder, 1865
Range.— Sulawesi Region.
— **E. sylvester glarang* Martin, 1912
Range.— Salayar.
— **E. sylvester* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kabaena, Muna.
— **E. sylvester agapa* Fruhstorfer, 1911
Range.— Kep. Banggai (Peleng).

E. phaenareta Schaller, 1785
(Giant Crow)

Range (W).— Sri Lanka, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands.

Foodplants.— *Cerbera, Plumeria* (Apocynaceae). Igarashi & Fukuda (1997) illustrate all life stages (Palawan).

— **E. phaenareta celebica* Fruhstorfer, 1898
Range.— Sulawesi (C).
— **E. phaenareta rolanda* Fruhstorfer, 1904
Range.— Sulawesi (C), Kep. Banggai (Peleng), Kep. Sula (Mangole).
— **E. phaenareta* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kep. Sangihe.
— **E. phaenareta locupletior* Fruhstorfer, 1899
Range.— Kep. Talaud.
— **E. phaenareta* subsp. (Ackery & Vane-Wright, 1984)
Range.— Buton.

**E. configurata* Felder & Felder, 1865
(Sulawesi Striped Blue Crow)

Range (E).— Sulawesi (including SE: Roos, 1995).

Status.— Listed as rare and threatened in 1994 (Groombridge, 1994), but removed from the red list in 1996 (Baillie & Groombridge, 1996).

**E. eupator* Hewitson, 1858
(Vanoort's Crow)

Range (R).— Sulawesi Region.

Status.— Listed as rare and threatened in 1994 (Groombridge, 1994), but removed from the red list in 1996 (Baillie & Groombridge, 1996).

— **E. eupator eupator* Hewitson, 1858
Range.— Sulawesi (N, C, S), Kep. Banggai (Peleng).
— * *E. eupator* subsp. (Roos, 1995)
Range.— Sulawesi (SE).
— **E. eupator vanoorti* Jurriaanse & Lindemans, 1920
Range.— Kabaena.
— **E. eupator thrasetes* Fruhstorfer, 1911
Range.— Salayar.

— **E. eupator sulaensis* Joicey & Talbot, 1922
Range.— Kep. Sula.

E. leucostictos Gmelin, 1790
(Orange-flash Crow)

Range (P).— Kep. Talaud, Kep. Sangihe, Bunaken, N & C Maluku, New Guinea region to New Caledonia and Fiji. Records of "*leucostictos*" from further west (e.g., Borneo: Otsuka, 1988) refer to *E. eunice* (see Ackery & Vane-Wright, 1984).

Foodplants.— *Ficus, Streblus* (Moraceae). Parsons (1999) illustrates the larva and pupa (Papua New Guinea).

— **E. leucostictos lykeia* Fruhstorfer, 1910
Range.— Kep. Talaud.
— **E. leucostictos depuiseti* Oberthür, 1879
Range.— Kep. Sangihe (Sangihe).
— **E. leucostictos* subsp. (BMNH)
Range.— Kep. Sangihe (Siao).
— **E. leucostictos* subsp. (BMNH)
Range.— Bunaken (island near Manado, N. Sulawesi).

**E. westwoodii* Felder & Felder, 1865
(Westwood's King Crow)

Range (R).— Sulawesi Region.

— **E. westwoodii meyeri* Hopffer, 1874
Range.— Sulawesi (N, C, SE - Roos, 1993).
— **E. westwoodii westwoodii* Felder & Felder, 1865
Range.— Sulawesi (S).
— **E. westwoodii* subsp. (BMNH)
Range.— Bangka.
— **E. westwoodii* subsp. (BMNH)
Range.— Buton.
— **E. westwoodii leochares* Fruhstorfer, 1910
Range.— Salayar, Tanahjampea.
— **E. westwoodii bangkaiensis* Fruhstorfer, 1899
Range.— Kep. Banggai (Peleng).
— **E. westwoodii labreyi* Moore, 1883
Range.— Kep. Sula (Mangole, Sanana).

**E. cordelia* Martin, 1912
(Cordelia Crow)

Range (E).— Sulawesi (C).
Status.— Vulnerable (Baillie & Groombridge, 1996).

E. eleusina Cramer, 1780
(Vollenhov's Crow)

Range (5+6).— Pulo Laut (off southern Borneo), Kangean, Bawean, Java, western Lesser Sunda Islands, Sulawesi Region.

Foodplants.— *Streblus asper* (Moraceae) (recorded by Igarashi & Fukuda, 1997: 414). Igarashi & Fukuda (2000) illustrate all life stages.

— **E. eleusina vollenhovii* Felder & Felder, 1865
Range.— Sulawesi (N, C, SE).

— **E. eleusina anitra* Fruhstorfer, 1910
Range.— Sulawesi (C).

— **E. eleusina palata* Fruhstorfer, 1910
Range.— Sulawesi (C).

— **E. eleusina mniszechii* Felder, 1859
Range.— Sulawesi (S).

— **E. eleusina aganor* Fruhstorfer, 1910
Range.— Kep. Banggai (Peleng).

**E. hewitsonii* Felder & Felder, 1865
(Hewitson's Dwarf Crow)

Range (R).— Sulawesi Region.

— **E. hewitsonii hewitsonii* Felder & Felder, 1865
Range.— Sulawesi, Kep. Banggai (Peleng).

— **E. hewitsonii reducta* Jurriaanse, 1919
Range.— Buton, Kabaena, Muna.

— **E. hewitsonii mangolina* Fruhstorfer, 1899
Range.— Kep. Sula (Mangole).

— **E. hewitsonii besinensis* Fruhstorfer, 1899
Range.— Kep. Sula (Sanana).

E. algea Godart, 1819
(Long-branded Crow, Mournful Crow, Algea Crow)

Range (1+3+4+5+6+7).— Northern India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Sulawesi Region, N & C Maluku, New Guinea region, New Caledonia, Pacific islands, Australia. The validity of this taxon is open to doubt (Ackery & Vane-Wright, 1984).

Foodplants.— *Ichnocarpus* (Apocynaceae); *Cynanchum* (Asclepiadaceae); *Ficus, Streblus* (Moraceae). Igarashi & Fukuda (2000) illustrate all life stages of the distinctive Palau race. Parsons (1999) illustrates the pupa (Papua New Guinea).

— **E. algea kirbyi* Felder & Felder, 1865
Range.— Sulawesi (N).

— **E. algea horsfieldii* Felder & Felder, 1865
Range.— Sulawesi (C, S, SE - Roos, 1993).

— **E. algea bevagna* Fruhstorfer, 1911
Range.— Kep. Sangihe.

— **E. algea talautensis* Piepers & Snellen, 1896
Range.— Kep. Talaud.

— **E. algea maura* Hopffer, 1874
Range.— Kep. Togian.

— **E. algea laodikeia* Fruhstorfer, 1910
Range.— Salayar.

— **E. algea tombugensis* Fruhstorfer, 1899
Range.— Wowoni, Buton, Kabaena, Muna.
— **E. algea wiskotti* Röber, 1887
Range.— Kep. Banggai (Peleng).
— **E. algea corvina* Fruhstorfer, 1898
Range.— Kep. Sula (Mangole, Sanana).

E. core Cramer, 1780
(Common Crow, Common Indian Crow)

Range (P).— One member of a group of five or more allopatric species (Vane-Wright, 1993b.) widely but discontinuously distributed in the Oriental, Australian and Pacific Regions. The complex is apparently unrepresented in Borneo, Philippines, Sulawesi, Maluku and New Guinea. The oldest named member, *E. core* Cramer *sensu stricto*, is distributed from Sri Lanka through India to China, southwards through the Malay Peninsula to Sumatra, Java and the Lesser Sundas islands (where it may be being replaced by the common and well-known Australian Region member of the complex, *E. corinna* Macleay), just penetrating the southern Sulawesi Region in Kalao and Salayar. Other members of the complex occur in the Andamans (*E. andamanensis* Atkinson), Nicobars (*E. scherzeri* Felder), Biak and Bismarck Archipelago (*E. charox* Kirsch), with further splinter-species probably separable in the Solomons area.

Foodplants.— numerous genera in the Apocynaceae, Asclepiadaceae, Moraceae and Periplocaceae. Igarashi & Fukuda (2000) illustrate all life stages (India).
— **E. core bauermanni* Röber, 1885
Range.— Salayar.
— **E. core kalaona* Fruhstorfer, 1898
Range.— Kalao.

E. latifasciata Weymer, 1885
(Broad-banded Crow)

Range (3).— Sulawesi Region, northern Maluku (including Obi).
— **E. latifasciata latifasciata* Weymer, 1885
Range.— Sulawesi (see Roos, 1993).
— **E. latifasciata hashimotoi* Detani, 1983
Range.— Kep. Banggai (Peleng).

E. redtenbacheri Felder & Felder, 1865
(Redtenbacher's Crow)

Range (3+4).— Southern Ryukyu Islands (Uesugi, 1984; requires confirmation), Sulawesi, northern Maluku, central Maluku (Buru).
— **E. redtenbacheri coracina* Hopffer, 1874
Range.— Sulawesi (N).
— **E. redtenbacheri redtenbacheri* Felder & Felder, 1865
Range.— Sulawesi (C, S).
— **E. redtenbacheri selayarensis* Tsukada & Nishiyama, 1979
Range.— Salayar.

Idea Fabricius, 1807

(tree nymphs, ghosts, spectres, ideas, paper butterflies — Pl. 16, figs 2, 3)

Range (1+2+3+4+6+7).— Sri Lanka, southern India, Burma, Malay Peninsula, Sumatra, Java and Borneo east to New Guinea (Irian Jaya), including Philippines, Taiwan and Ryukyu Islands, but absent from Lesser Sunda Islands. A genus of 12 species divided into two subgenera, only one of which occurs in Sulawesi.

Foodplants.— Apocynaceae, Asclepiadaceae.

Key works.— Morishita (1981), Ackery & Vane-Wright (1984), Kitching *et al.* (1987), Okano (1985).

Idea (Idea) Fabricius, 1807

Range.— As genus, except for Sri Lanka, southern India and northern Burma. Seven species; of the two found on Sulawesi, one represents a stem lineage of the subgenus (*tambusisiana*). The other (*blanchardii*) is most closely related to a pair of species from Maluku and the Vogelkop. A third species (*leuconoe*) is represented in the most northerly part of the Sulawesi Region, and a fourth (*idea*) occurs on Kep. Sula.

Foodplants.— As genus.

**I. (I.) blanchardii* Marchal, 1845

(Blanchard's Ghost or Tree Nymph — Pl. 16, fig. 2)

Range (R).— Sulawesi Region.

Foodplants.— Unknown in nature, but Igarashi & Fukuda (2000), who illustrate all life stages, successfully raised this species on non-native *Parsonsia* (Apocynaceae).

— **I. (I.) blanchardii blanchardii* Marchal, 1845
Range.— Sulawesi (N), Bangka, Kep. Sangihe (Siao).

— **I. (I.) blanchardii marosiana* Fruhstorfer, 1903
Range.— Sulawesi (S).

— **I. (I.) blanchardii paluana* Martin, 1914
Range.— Sulawesi (C).

— *I. (I.) *blanchardii* subsp. (Roos, 1993)
Range.— Sulawesi (SE).

— **I. (I.) blanchardii garunda* Fruhstorfer, 1910
Range.— Kep. Sangihe (Sangihe).

— **I. (I.) blanchardii munaensis* Fruhstorfer, 1899
Range.— Kabaena, Muna.

— **I. (I.) blanchardii phlegeton* Fruhstorfer, 1904
Range.— Kep. Tukangbesi (Tolandono).

— **I. (I.) blanchardii silayara* Martin, 1914
Range.— Salayar.

— **I. (I.) blanchardii djampeana* Fruhstorfer, 1899
Range.— Tanahjampea.

— **I. (I.) blanchardii* subsp. (Ackery & Vane-Wright, 1984)
Range.— Kalao.

— **I. (I.) blanchardii kuehni* Röber, 1887
Range.— Kep. Banggai (Peleng).

I. (I.) idea Linnaeus, 1763
(Linnaeus' Idea)

Range (P).— Kep. Sula, C. Maluku, Kep. Banda, Goram.

— **I. (I.) idea sula* de Nicéville, 1900
Range.— Kep. Sula (Mangole, Sanana)

**I. (I.) tambusisiana* Bedford Russell, 1981
(Bedford Russell's Idea — Pl. 16, fig. 3)

Range (E).— Sulawesi.

Status.— Vulnerable (Baillie & Groombridge, 1996).

— **I. (I.) tambusisiana tambusisiana* Bedford Russell, 1981
Range.— Sulawesi (C).

— **I. (I.) tambusisiana hideoi* Okano, 1985
Range.— Sulawesi (C).

I. (I.) leuconoe Erichson, 1834
(Siam Tree Nymph)

Range (P).— Thailand, Malay Peninsula, Sumatra, ?Java, Borneo, Palawan, Philippines, Taiwan, Ryukyu Islands, Kep. Talaud, Kep. Sangihe.

Foodplants.— *Parsonsia* (Apocynaceae); *Cynanchum, Dregea, Tylophora* (Asclepiadaceae). Igarashi & Fukuda (1997) illustrate all life stages (Philippines).

— **I. (I.) leuconoe godmani* Oberthür, 1879
Range.— Kep. Sangihe (Sangihe).

— **I. (I.). leuconoe esanga* Fruhstorfer, 1898
Range.— Kep. Talaud.

Heliconiinae Swainson, 1822
(fritillaries, heliconians, acraeas, lacewings - Pl. 11, figs 3-8; Pl. 12, figs 1-4)

Range.— Cosmopolitan, except New Zealand. Another large and widespread group, it has been considered to comprise about 40 genera divided among four named tribes, and an unnamed tribal assemblage. For a long period the exclusively American and well-characterised tribe the Heliconiini (as prescribed by Michener, 1942) was ranked as a full subfamily, but in recent years the group has been widened to embrace the tropical Acraeini (often treated in the past as a separate subfamily also), the mainly north-temperate Argynnini and Boloriini, and an uncharacterised series of genera including *Cethosia, Vindula, Cupha, Phalanta* and *Yramea* (Harvey, 1991). The Pardopsini are a monobasic African group, in the past included within the Acraeini, but now considered of uncertain affinity. New insights into the classification of the Heliconiinae are given by Penz & Peggie (submitted), who propose to recognise three tribes, but we cannot fully anticipate their results here.

Foodplants.— Mainly Asteraceae, Flacourtiaceae, Passifloraceae, Urticaceae and Violaceae.

Key works.— Michener (1942), Warren (1944, 1955), Dos Passos & Grey (1945), Brown (1981), Ackery (1988), Teshirogi (1990), Harvey (1991), Brower (2000), Penz & Peggie (submitted).

unnamed tribal assemblage, incertae sedis
(Pl. 11, figs 5-8; Pl. 12, figs 1-3)

Range.— An assemblage of about 16 genera, collectively worldwide in their distribution, 7 of which are represented on Sulawesi. Harvey (1991) listed most of those included in two groups as "subtribe uncertain", to which the Boloriina must be added.

Note added in proof.— If the scheme proposed by Penz & Peggie (submitted) is accepted, then the next seven genera (*Terinos* to *Phalanta*) will be included in a named subtribe of the Heliconiini.

Key works.— Harvey (1991), Brower (2000).

Terinos Boisduval, 1836
(assyrians — Pl. 11, fig. 5)

Range (1+2+3+6+7).— Oriental and Australian Regions, from Burma to the Bismarcks, but absent from Australia, C Maluku and Lesser Sundas. About eight species, only one of which occurs on Sulawesi.

Foodplants.— Euphorbiaceae (*Antidesma*), Flacourtiaceae (*Casearia*: Nuyda & Kitamura, 1993b; *Homalium*: Igarashi & Fukuda, 1997), Stilaginaceae, Violaceae (*Rinorea*: Parsons, 1999).

Key works.— Brooks (1930), Tsukada (1985), Corbet & Pendlebury (1992).

T. taxiles Hewitson, 1862
(Pl. 11, fig. 5)

Range (3).— Sulawesi Region, N Maluku, New Guinea region. Parsons (1999) formally treated the New Guinea and Bismarck components as distinct species, under the names *T. alurgis* Godman & Salvin and *T. maddelena* Grose-Smith & Kirby, but conceded that "*alurgis* may be better treated as a race of … *abisares* … known only from Sulawesi … this may also be true of *maddelena* …" Here we treat them as a single species; at the very least, it seems likely that the northern Maluku populations belong to the same species-level taxon as the Sulawesi *taxiles*.

Foodplants.— *Rinorea* (Violaceae: Parsons, 1999, for *T. alurgis*). Parsons (1999) also illustrates the larva (Papua New Guinea).

— **T. taxiles abisares* Felder & Felder, 1867
Range.— Sulawesi (N), Kep. Togian.

— **T. taxiles poros* Fruhstorfer, 1906
Range.— Sulawesi (S).

— **T. taxiles banggaiensis* Detani, 1983
Range.— Kep. Banggai (Peleng).

— **T. taxiles angurium* Tsukada, 1985
Range.— Kep. Sula (Sanana).

T. clarissa Boisduval, 1836
(The Assyrian)

Range (P).— Southern Burma, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Kep. Sangihe.

Foodplants.— *Homalium* (Flacourtiaceae) and *Rinorea* (Violaceae), the former recored by Igarashi & Fukuda (2000), who also illustrate all life stages (Palawan).

— **T. clarissa ludmilla* Staudinger, 1889

Range.— Kep. Sangihe.

Vindula Hemming, 1934
(cruisers — Pl. 11, fig. 6)

Range (W).— Oriental and Australian Regions, from Sri Lanka to N & C Maluku and the Solomon Islands, including Australia. A small group of three or four species (see Parsons, 1989, 1999), often difficult to separate; two occur on Sulawesi.

Foodplants.— Passifloraceae.

Key works.— Eliot (1956), Nieuwenhuis (1962), Common & Waterhouse (1981), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992).

V. erota Fabricius, 1793
(Common Cruiser — Pl. 11, fig. 6)

Range (1+6+7).— Sri Lanka, India, Indo-China, China, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Sulawesi Region.

Note.— Material currently identified as *erota* from the Sulawesi Region may represent a distinct endemic species, for which *boetonensis* would probably be the oldest available name.

Foodplants.— *Adenia, Modecca, Passiflora* (Passifloraceae). Igarashi & Fukuda (1997) illustrate all life stages (Thailand).

— **V. erota banta* Eliot, 1956

Range.— Sulawesi.

— **V. erota boetonensis* Jurriaanse & Lindemans, 1920

Range.— Buton.

— **V. erota sulaensis* Joicey & Talbot, 1924

Range.— Kep. Sula (Sanana).

V. dejone Erichson, 1834
(Erichson's Cruiser)

Range (W).— Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Adenia, Passiflora* (Passifloraceae). Igarashi & Fukuda (1997) illustrate eggs and pupae (Philippines).

— **V. dejone celebensis* Butler, 1883

Range.— Sulawesi, Buton.

— **V. dejone susanoo* Tsukada, 1985

Range.— Kep. Talaud (Karakelong, Kaburuang).

— **V. dejone kabiana* Fruhstorfer, 1912

Range.— Salayar.

— *V. dejone austrosundana* Fruhstorfer, 1897

Range.— Java, Lesser Sunda Islands, Kalao.

— **V. dejone bushi* Tsukada, 1985

Range.— Kabaena.

— **V. dejone satellitica* Fruhstorfer, 1899
Range.— Kep. Banggai (Peleng).
— **V. dejone dioneia* Fruhstorfer, 1912
Range.— Kep. Sula (Mangole, Sanana).

Cupha Billberg, 1820
(rustics — Pl. 11, fig. 7)

Range (W).— Oriental and Australian Regions, from Sri Lanka to New Guinea, Solomon Islands and Australia. A genus of about ten species, three of which are found in the Sulawesi Region.

Foodplants.— Euphorbiaceae (*Breynia*: may be error according to Braby, 2000; *Glochidion*), Flacourtiaceae (*Flacourtia, Homalium, Scolopia, Xylosma*), Rosaceae (*Photinia?*), Salicaceae (*Salix*), Sapindaceae (*Erioglossum, Lepisanthes*).

Key works.— Common & Waterhouse (1981), Tsukada (1985), Parsons (1989), Teshirogi (1990), Corbet & Pendlebury (1992).

C. arias Felder, 1867
(Pl. 11, fig. 7)

Range (1+2).— islands off coast NW Borneo (Mengalum, Mantanani), but not recorded from main island (Otsuka, 1988), Palawan, Philippines, Sulawesi Region.
— **C. arias celebensis* Fruhstorfer, 1899
Range.— Sulawesi, Kep. Banggai (Peleng; Nieuwenhuis, 1946).
— **C. arias sangirica* Fruhstorfer, 1912
Range.— Kep. Sangihe (Sangihe, Siao), Kep. Talaud (Karakelong, Salebabu).
— **C. arias muna* Fruhstorfer, 1897
Range.— Muna, Buton.
— **C. arias* subsp. (Rothschild Collection, BMNH)
Range.— Kep Tukangbesi.

**C. maeonides* Hewitson, 1859
Range (R).— Sulawesi Region.
— **C. maeonides maeonides* Hewitson, 1859 (including *m. rovena* Fruhstorfer)
Range.— Sulawesi, Kep. Togian (Waleabahi, Dolong), Muna, Kabaena.
— **C. maeonides butungensis* Tsukada, 1985
Range.— Buton.
— **C. maeonides nigrico* Tsukada, 1985
Range.— Kep. Banggai (Peleng).
— **C. maeonides maenada* Grose Smith, 1898
Range.— Kep. Sula (Mangole).

C. crameri Felder, 1860
Range (P).— Kalao, N & C Maluku, Gorong, Kep. Kai, western Irian Jaya.
— **C. crameri kalaoensis* Tsukada, 1985
Range.— Kalao.

***Algia* Herrich-Schäffer, 1864** (= *Paduca* Moore, 1886: see Hemming, 1967)
(yeomen — Pl. 11, fig. 8)

Range (1+2+6+7).— Oriental and Australian Regions, from Burma to New Guinea (disjunct), being unknown from Maluku and the Lesser Sunda Islands. Three species, the Sulawesi representative being endemic to the local region.

Foodplants.— Unrecorded, but Richard Carver discovered the early stages in Papua New Guinea, and they are thought to be similar to *Cirrochroa* (Parsons, 1999: 628).

Key works.— Igarashi (1985), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992).

A. fasciata Felder & Felder, 1860
(Branded Yeoman)

Range (P).— Southern Burma, Thailand, Malay Peninsula, Sumatra, Java, Borneo, Palawan, Philippines, Kep. Banggai, Kep. Sula.

— **A. fasciata lautus* Tsukada, 1985
Range.— Kep. Banggai (Peleng).

— **A. fasciata angustata* Fruhstorfer, 1912
Range.— Kep. Sula (Mangole).

**A. satyrina* Felder & Felder, 1867
(Pl. 11, fig. 8)

Range (R).— Sulawesi, Kep. Banggai.

— **A. satyrina satyrina* Felder & Felder, 1867
Range.— Sulawesi (N).

— **A. satyrina sibylla* Röber, 1887
Range.— Sulawesi (C, S).

— **A. satyrina* subsp. (Roos, 1995)
Range.— Sulawesi (SE).

— **A. satyrina similliana* Röber, 1887
Range.— Kep. Banggai (Peleng).

***Cirrochroa* Doubleday, 1847**
(yeomen — Pl. 12, fig. 1)

Range (1+2+3+5+6+7).— Oriental and Australian Regions, from Sri lanka to N Maluku, Flores and New Guinea. Of the 16-18 species, four regional endemics occur on Sulawesi.

Foodplants.— Flacourtiaceae (*Flacourtia, Hydnocarpus*).

Key works.— Brooks (1930), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992), Roos (1996).

**C. thule* Felder & Felder, 1860
(Pl. 12, fig. 1)

Range (R).— Sulawesi, Kep. Togian (Dolong), Kep. Banggai (Peleng).

**C. semiramis* Felder & Felder, 1867

Range (E).— Sulawesi.

**C. eremita* Tsukada, 1985

Range (E).— Sulawesi (N).

**C. recondita* Roos, 1996

Range (E).— Sulawesi (SE).

Vagrans Hemming, 1934

(vagrants — Pl. 12, fig. 2)

Range (W).— Oriental, Australian and Pacific Regions, from northern India to Samoa and Tahiti. Two allopatric species according to Tsukada (1985), who is followed here (and by Treadaway, 1995), but many authors (e.g. Pinratana & Eliot, 1996; Igarashi & Fukuda, 1997; Parsons, 1999) still recognise only one (*egista* Cramer, 1780).

Foodplants.— Dilleniaceae (*Dillenia*: Igarashi & Fukuda, 1997), Flacourtiaceae (*Flacourtia*; *Homalium*: Braby, 2000; *Xylosma*: Bascombe *et al.*, 1999).

Key works.— Common & Waterhouse (1981), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992).

V. sinha Kollar, 1844

(The Vagrant — Pl. 12, fig. 2)

Range (1+2+5+6+7).— Northern India, China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region.

Foodplants.— *Flacourtia* (Flacourtiaceae). Igarashi & Fukuda (1997) illustrate all life stages (as *egista*, Malaya).

— **V. sinha nupta* Staudinger, 1889

Range.— Sulawesi (N, C), Kep. Sula (Sanana).

Phalanta Horsfield, 1829

(leopards — Pl. 12, fig. 3)

Range (W).— Afrotropical, Oriental, Australian and Pacific Regions. Five species, with both the Indo-Australian species being found in Sulawesi (Parsons, 1989, recognised only four, and Parsons, 1999, possibly five).

Foodplants.— Celastraceae, Flacourtiaceae, Rubiaceae, Salicaceae, Smilacaceae, Violaceae.

Key works.— Common & Waterhouse (1981), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992).

P. alcippe Stoll, 1782

(Small Leopard — Pl. 12, fig. 3)

Range (W).— Sri Lanka, northern India, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku, New Guinea region, Solomon Islands, Samoa.

Foodplants.— *Flacourtia, Hydnocarpus* (Flacourtiaceae); *Salix* (Salicaceae); *Alsodeia, Melicytus, Rinorea* (Violaceae). Igarashi & Fukuda (1997) illustrate all life stages (Sulawesi).

— **P. alcippe celebensis* Wallace, 1869
Range.— Sulawesi, Wowoni, Kep. Togian (Waleabahi).

— **P. alcippe onyx* Tsukada, 1985
Range.— Kep. Talaud (Kaburuang).

— *P. alcippe aridus* Tsukada, 1985
Range.— Sumba, Kalao.

— **P. alcippe handjahi* Tsukada, 1985
Range.— Kep. Banggai (Peleng).

— **P. alcippe omarion* Fruhstorfer, 1912
Range.— Kep. Sula (Mangole).

P. phalantha Drury, 1773
(Common Leopard, Spotted Rustic)

Range (1+2+5+6+7).— Afrotropical Region, Sri Lanka, India, China, Indo-China, Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Palawan, Philippines, southern Sulawesi Region, northern Australia.

Foodplants.— *Gymnosporia, Maytenus* (Celastraceae); *Petalostigma* (Euphorbiaceae); *Aberia, Doryalis, Flacourtia, Scolopia, Trimeria, Xylosma* (Flacourtiaceae); *Canthium, Ixora* (Rubiaceae); *Populus, Salix, Scolopia* (Salicaceae); *Smilax* (Smilacaceae). Igarashi & Fukuda (1997) illustrate all life stages (India), as do Bascombe *et al.* (1999) (Hong Kong).

— **P. phalantha sabulum* Tsukada, 1985
Range.— Sulawesi (S), Buton.

Argynnini Swainson, 1833
(fritillaries — Pl. 12, fig. 4)

Range.— mainly north temperate. The approximately 100 species are divided into about 12 genera, of which one occurs on Sulawesi.

Foodplants.— Flacourtiaceae, Stilaginaceae, Violaceae.

Key works.— Ackery (1988), Parsons (1989), Teshirogi (1990), Harvey (1991), Corbet & Pendlebury (1992), Brower (2000).

Argyreus Scopoli, 1777
(The Indian Fritillary, Laced Fritillary — Pl. 12, fig. 4)

Range (5+6).— Ethiopia, Sri Lanka, India, China, Japan, Indo-China, Malay Peninsula, Sumatra, Java, Bali, Lesser Sunda Islands (Flores), Philippines (Luzon, Mindoro), Sulawesi, New Guinea, Australia. A monobasic but polytypic montane genus with a most interesting distribution. Not recorded from Maluku (Samson, 1976).

Foodplants.— Violaceae.

Key works.— Warren (1955), Common & Waterhouse (1981), Tsukada (1985), Teshirogi (1990), Corbet & Pendlebury (1992).

A. hyperbius Linnaeus, 1763
(The Indian Fritillary — Pl. 12, fig. 4)

Range (5+6).— as genus.

Foodplants.— *Viola* (Violaceae). Teshirogi (1990) (Japan) and Bascombe *et al.* (1999) (Hong Kong) illustrate all life stages.

— **hyperbius centralis* Martin, 1913

Range.— Sulawesi (C).

Acraeini Boisduval, 1833
(acraeas, costers, lacewings — Pl. 11, figs 3, 4)

Range.— Pantropical. Over 200 species, included in only three genera.

Foodplants.— Mainly Asteraceae, Passifloraceae, Urticaceae.

Key works.— Pierre (1984, 1987), Ackery (1988), Harvey (1991), Brower (2000).

***Acraea* Fabricius, 1807**
(acraeas, costers — Pl. 11, fig. 3)

Range (3+4+5+6).— Palaeotropics. Only weakly represented in the Indo-Pacific region by about four or five species collectively occurring in India, China, Indo-China, Burma, Sumatra, Java, Lesser Sunda Islands, Sulawesi, N & C Maluku, New Guinea, Solomon Islands, Australia, New Caledonia, Samoa and Fiji, but the genus is not known from the Malay Peninsula, Borneo or the Philippines. Two species are found in the Sulawesi Region.

Foodplants.— Passifloraceae, Malvaceae, Violaceae, Urticaceae.

Key works.— Common & Waterhouse (1981), Pierre (1984), Tsukada (1985), Corbet & Pendlebury (1992).

A. andromacha Fabricius, 1775
(The Glasswing)

Range (P).— Lesser Sunda Islands, Salayar, Kabia (E of Tanahjampea), Kep. Tukangbesi (Tomea, Binongko), New Guinea, Solomon Islands (New Georgia), Australia, New Caledonia, Samoa, Fiji.

Foodplants.— *Adenia, Passiflora* (Passifloraceae); *Hybanthus* (Violaceae). Parsons (1999) illustrates the larva (Papua New Guinea), and Braby (2000) describes larval behaviour.

— **A. andromacha indica* Röber, 1885

Range.— Salayar, Kabia, Kep. Tukangbesi (Tomea, Binongko).

A. moluccana Felder, 1860
(Eastern Mountain Coster — Pl. 11, fig. 3)

Range (3+4).— Sulawesi Region, N & C Maluku, Papua New Guinea, Woodlark, Bismarcks, Admiralty Islands, Solomon Islands.

— **A. moluccana dohertyi* Holland, 1891

Range.— Sulawesi (N, C, S), Buton (material in ZSBS).

— **A. moluccana parce* Staudinger, 1896

Range.— Kep. Sula (Mangole).

Cethosia Fabricius, 1807

(lacewings — Pl. 11, fig. 4)

Range (W).— Throughout the Indo-Australian Region, from Sri Lanka to China, Lesser Sunda Islands, Sulawesi region, Maluku, New Guinea Region and northern Australia. About 15 species (Parsons, 1989, 1999, recognises only 10), 4 of which have been found in the Sulawesi Region.

Note added in proof.— In the scheme proposed by Penz & Peggie (submitted), this genus is placed as a true heliconiine (tribe Heliconiini, subtribe Heliconiina).

Foodplants.— Apocynaceae (*Parsonsia*: Igarashi & Fukuda, 1997), mainly Passifloraceae (e.g. *Adenia*).

Key works.— Common & Waterhouse (1981), Tsukada (1985), Parsons (1989), Corbet & Pendlebury (1992).

C. biblis Drury, 1773

(The Red Lacewing — Pl. 11, fig. 4)

Range (1+2+3+4+6+7).— Northern India, Nepal, China, Indo-China, Malay Peninsula, Sumatra, western Java, Borneo, Palawan, Philippines, Sulawesi Region, N & C Maluku.

Foodplants.— *Adenia, Balbas, Modecca, Passiflora* (Passifloraceae). Igarashi & Fukuda (1997) illustrate all life stages (Nepal), as do Bascombe *et al.* (1999) (Hong Kong).

— **C. biblis sarsina* Fruhstorfer, 1912
Range.— Sulawesi (N, C), Kep. Talaud (requires confirmation).

— **C. biblis picta* Felder & Felder, 1866
Range.— Sulawesi (C, S), Kabaena, Muna, Buton.

— **C. biblis togiana* Fruhstorfer, 1902
Range.— Kep. Togian.

**C. myrina* Felder & Felder, 1867

(Violet Lacewing)

Range (R).— Sulawesi Region.

Foodplants.— Raised on non-native *Adenia* (Passifloraceae) by Igarashi & Fukuda (2000), who also illustrate the larva and pupa.

— **C. myrina myrina* Felder & Felder, 1867
Range.— Sulawesi (N).

— **C. myrina melancholica* Fruhstorfer, 1909
Range.— Sulawesi (C), Kep. Togian (Waleabahi).

— **C. myrina sarnada* Fruhstorfer, 1912
Range.— Sulawesi (S).

— **C. myrina vanbemmeleni* Jurriaanse & Lindemans, 1918
Range.— Buton.

— **C. myrina ribbei* Honrath, 1886
Range.— Kep. Banggai (Peleng).

C. tambora Doherty, 1891

Range (P).— Eastern Java, Bawean, Lesser Sunda Islands, Kalao.

— **C. tambora atia* Fruhstorfer, 1905
Range.— Tanahjampea, Kalao.

C. cydippe Linnaeus, 1763
(Eastern Red Lacewing)

Range (P).— Kep. Sangihe, N & C Maluku, New Guinea region, northern Australia.
Foodplants.— *Adenia, Hollrungia* (Passifloraceae).

— **C. cydippe sangira* Fruhstorfer, 1906
Range.— Kep. Sangihe (requires confirmation).

References

Ackery, P.R., 1987. The danaid genus *Tellervo* - a cladistic approach.— Zoological Journal of the Linnean Society 89: 203-274.

Ackery, P.R., 1988. Hostplants and classification: a review of nymphalid butterflies.— Biological Journal of the Linnean Society 33: 95-203.

Ackery, P.R., 1989. Systematic and faunistic studies on butterflies. In: R.I. Vane-Wright & P.R. Ackery (eds). The Biology of Butterflies (paperback edn): 9-21.— New Jersey.

Ackery, P.R. & Vane-Wright, R.I., 1984. Milkweed Butterflies: i-ix, 1-425.— New York.

Ackery, P.R., Smith, C.R. & Vane-Wright, R.I. (eds), 1995. Carcasson's African butterflies: an annotated catalogue of the Papilionoidea and Hesperioidea of the Afrotropical Region: i-xi, 1-803.— East Melbourne.

Ackery, P.R., de Jong, R. & Vane-Wright, R.I., 1999. The butterflies. In: N.P. Kristensen (ed.). Handbuch der Zoologie, Vol. IV, part 35, Lepidoptera, Moths and Butterflies: 263-300.— Berlin & New York.

Ae, S., 1977. Immature stage and genetics of *Papilio hipponous* (Lepidoptera: Papilionidae).— Tyô to Ga 28: 147-150.

Agarwala, B. K. & Saha, J. L., 1984. Aphidophagous habit of the larvae of *Chilades lajus lajus* (Cramer).— Tyô to Ga 34: 171-172.

Aoki, T., Yamaguchi, S. & Uémura, Y., 1982. Satyridae, Libytheidae. In: E. Tsukada (ed.). Butterflies of the South East Asian Islands 3: 1-628.— Tokyo.

Araújo, M.B, Williams, P.H. & Fuller, R.J., 2002. Dynamics of extinction and the selection of nature reserves.— Proceedings of the Royal Society of London B 269: 1971-1980.

Atkins, H., Preston, J. & Cronk, Q.C.B., 2001. A molecular test of Huxley's line: *Cyrtandra* (Gesneriaceae) in Borneo and the Philippines.— Biological Journal of the Linnean Society 72: 143-159.

Audley-Charles, M.G., 1986. Timor-Tenimbar Trough; the foreland basin of the evolving Banda orogen.— Special Publications International Association Sedimentology 8: 91-102.

Audley-Charles, M.G., 1993. Geological evidence bearing upon the Plioicene emergence of Seram, an island colonizable by land plants and animals. In: I.A. Darwin, A.A. Macdonald & J. Proctor (eds), Natural History of Seram: 13-18.— Andover.

Baillie, J. & Groombridge, B., 1996. 1996 IUCN red list of threatened animals, 70 + 368 + 10 pp.— Gland (Switzerland) and Cambridge (UK).

Bampton, I., 1995. A discussion of the larval food of the subfamily Lipteninae (Lepidoptera, Lycaenidae).— Metamorphosis 6: 162-166.

Barlow, H.S., 1982. An introduction to the moths of South East Asia.— Kuala Lumpur.

Bascombe, M.J., Johnston, G. & Bascombe, F.S. 1999. The butterflies of Hong Kong.— London.

Bean, A. E., 1964. Notes on the life history of *Nacaduba pactolus continentalis* Früh. (Lepidoptera: Lycaenidae) from Poona district, Western Ghats.— Journal of the Bombay Natural History Society 61: 614-626.

Bedford Russell, A., 1984. Two new skippers from Sulawesi (Celebes) (Lepidoptera: Hesperiidae).— Entomologische Berichten, Amsterdam 44: 154-156.

Bell, T. R., 1919. The common butterflies of the plains of India. Parts 17-25.— Journal of the Bombay Natural History Society 26: 438-487.

Bennett, N.H., 1950. A revision of the *echerius* group of the genus *Abisara* Felder (Rhop. Riodinidae).— The Entomologist 83: 1-9, 34-42.

Braby, M.F., 2000. Butterflies of Australia, Their Identification, Biology and Distribution, Vol. 1 + 2: 1-976.— Collingwood.

Bridges, C.A., 1988a. Catalogue of Papilionidae and Pieridae.— Urbana, Illinois.

Bridges, C.A., 1988b. Catalogue of Lycaenidae and Riodinidae.— Urbana, Illinois.

Bridges, C.A., 1988c. Catalogue of family-group and species-group names (Rhopalocera).— Urbana, Illinois.

Bridges, C.A. 1994. Catalogue of Hesperiidae; 2nd edition.— Urbana, Illinois.

Brooks, C.J., 1930. Terinos and Cirrochroa (Lep. Nymph.): revisional notes.— The Entomologist 63: 208-210.

Brower A.V.Z., 2000. Phylogenetic relationships among the Nymphalidae (Lepidoptera), inferred from partial sequences of the *wingless* gene.— Proceedings of the Royal Society of London (B) 267: 1201-1211.

Brown, K.S. jr, 1981. The biology of *Heliconius* and related genera.— Annual Review of Entomology 26: 427-456.

Cantlie, K., 1962. The Lycaenidae portion (except the *Arhopala* group) of Brigadier Evans' The Identification of Indian Butterflies 1932 (India, Pakistan, Ceylon, Burma).— Bombay.

Cantlie, K., 1964. Genitalia of the butterfly genera *Surendra* Moore and *Everes* Hübner.— Journal of the Bombay Natural History Society 61: 210-212, 1 pl.

Cassidy, A.C., 1985. An enlarged checklist of Brunei butterflies (Lepidoptera: Rhopalocera) including descriptions of one new species and two new subspecies.— Brunei Museum Journal 6: i-iii, 135-168.

Cassidy, A.C., 1990. On *Nacaduba* and allied genera (Lepidoptera, Lycaenidae) from the Sulawesi Region.— Tyô to Ga 41: 227-241.

Cassidy, A.C., 1995a. On the Miletini (Lepidoptera, Lycaenidae) of the Sulawesi Region.— Transactions of the Lepidopterological Society of Japan 46: 1-12.

Cassidy, A.C., 1995b. On the *Lycaenopsis* group of genera (Lepidoptera, Lycaenidae) of the Sulawesi Region.— Transactions of the Lepidopterological Society of Japan 46: 45-62.

Chermock, R.L., 1950. A generic revision of the Limenitini of the World.— American Midland Naturalist 43: 513-569.

Chiba, H., 1988. A lepidopterist's view of panbiogeography: Rivista di Biologia.— Biology Forum 81: 553-568.

Chiba, H., 1989. Description of the hitherto unknown female of *Acerbas suttoni* Russell (Hesperiidae).— Journal of Research on the Lepidoptera 27: 260-261.

Chiba, H., 1992. Systematics and biogeography of the genus *Choaspes* (Lepidoptera: Hesperiidae) - an alternative view.— Butterflies, Japan 2: 39-42.

Chiba, H., 1995. A revision of the subfamily Coeliadinae of the world.— Unpublished PhD thesis, University of Hawaii.

Chiba, H., 1997. Miscellaneous notes on skippers.— Insects & Nature 32(4): 29-33.

Chiba, H. & Eliot, J.N., 1991. A revision of the genus *Parnara* Moore (Lepidoptera, Hesperiidae) with special reference to the Asian species.— Tyô to Ga 17: 179-194.

Chiba, H. & Tsukiyama, H., 1993. A review of the genus *Pirdana* Distant (Lepidoptera: Hesperiidae).— Butterflies, Japan 6: 19-25.

Chiba, H. & Tsukiyama, H., 1994. A revisional note on the genus *Pirdana* Distant (Lepidoptera: Hesperiidae).— Butterflies, Japan 7: 56.

Chou, I., 1990. Monographia Rhopalocerum Sinensium, Vol 1 + 2: 1-854.— Henan.

Chou, I., 1998. Classification and Identification of Chinese Butterflies: 1-349, 90 pls.— Henan.

Collins, N.M. & Morris, M.G., 1985. Threatened swallowtail butterflies of the world: i-vii, 1-403, 8 pls.— Gland & Cambridge.

Collins, N.M., Sayer, J.A. & Whitmore, T.C., 1991. The Conservation Atlas of Tropical Forests, Asia and the Pacific 1-256.— Gland & Cambridge.

Common, I.F.B., 1970. Lepidoptera (moths and butterflies). In: I.D. Naumann (ed.). The insects of Australia: 765-866.— Melbourne.

Common, I.F.B., 1978. The distinction between *Hypolimnas antilope* (Cramer) and *H. anomala* (Wallace)

(Lepidoptera: Nymphalidae) and the occurrence of *H. anomala* in Australia.— Australian Entomological Magazine 5: 41-44.
Common, I.F.B., 1990. Moths of Australia: i-vi, 1-535, 32 pls.— Carlton.
Common, I.F.B. & Waterhouse, D.F., 1981. Butterflies of Australia [2nd edn, revised] i-xiv, 1-682, 49 pls.— Sydney.
Corbet, A.S., 1941. A key to the Indo-Malayan species of *Arhopala* Boisduval (Lepidoptera: Lycaenidae).— Proceedings of the Royal Entomological Society of London (B) 10: 149-183.
Corbet, A.S., 1946a. The conspecificity of *Phrissura aegis* (C. & R. Felder) and *Udaiana cynis* (Hew.) (Lepidoptera: Pieridae).— The Entomologist 79: 145-146.
Corbet, A.S., 1946b. Observations on the Indo-Australian species of the genus *Arhopala* Boisduval (Lepidoptera: Lycaenidae).— Transactions of the Royal Entomological Society of London 96: 73-88, 6 pls.
Corbet, A.S. & Pendlebury, H.M., 1978. The butterflies of the Malay Peninsula [3rd edn, revised by J.N. Eliot] i-xiv, 1-578, 35 pls + frontispiece.— Kuala Lumpur.
Corbet, A.S. & Pendlebury, H.M., 1992. The butterflies of the Malay Peninsula [4th edn, revised by J.N. Eliot]: i-x, 1-595, 69 pls + frontispiece.— Kuala Lumpur.
Cottrell, C.B., 1984. Aphytophagy in butterflies: its relationship to myrmecophily.— Zoological Journal of the Linnean Society 80: 1-57.
Cottrell, C.B., 1987. The extraordinary *Liphyra* butterfly.— Transvaal Museum Bulletin 22: 2-5.
Cowan, C.F., 1955. The status of the genus *Saletara* Distant (Lepidoptera, Rhopalocera) and its species.— Bulletin of the Raffles Museum, Singapore 25: 171-184.
Cowan, C.F., 1966a. The nomenclature of *Pithecops corvus* and allied species.— Annals and Magazine of Natural History (13) 8: 421-425.
Cowan, C.F., 1966b. The Indo-Oriental Horagini (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History) (Entomology) 18: 103-141, 3 pls.
Cowan, C.F., 1967. The Indo-Oriental tribe Cheritrini (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History) (Entomology) 20: 75-103, 4 pls.
Cowan, C.F., 1974. The Indo-Oriental genus *Drupadia* Moore (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History) (Entomology) 29: 281-356, 6 pls.
d'Abrera, B., 1975. Birdwing butterflies of the world: 1-260.— Melbourne.
d'Abrera, B., 1977. Butterflies of the Australian Region (2nd edn): 1-415.— Melbourne.
d'Abrera, B., 1980. Butterflies of the Afrotropical Region: i-xx, 1-593.— Melbourne.
d'Abrera, B., 1982. Butterflies of the Oriental Region, 1, Papilionidae, Pieridae and Danaidae: i-xxi, 1-244.— Ferny Creek, Australia.
d'Abrera, B., 1985. Butterflies of the Oriental Region, 2, Nymphalidae, Satyridae & Amathusiidae: 245-534.— Ferny Creek, Australia.
d'Abrera, B., 1986. Butterflies of the Oriental Region, 3, Lycaenidae & Riodinidae: i-xv , 535-672.— Ferny Creek, Australia.
d'Abrera, B., 1990. Butterflies of the Australian Region (3rd, revised edn): 1-416.— Ferny Creek, Australia.
d'Abrera, B. 2001. The Concise Atlas of Butterflies of the World: 1-353.— Melbourne.
Detani, H., 1983. Butterflies of Peleng Island.— Iwase, Japan 1: 30-60, 71-72, 8 pls.
DeVries, P.J., 1984. Of crazy-ants and Curetinae: are *Curetis* butterflies tended by ants?— Zoological Journal of the Linnean Society 80: 59-66.
DeVries, P.J., Kitching, I.J. & Vane-Wright, R.I., 1985. The systematic position of *Antirrhea* and *Caerois*, with comments on the classification of the Nymphalidae (Lepidoptera).— Systematic Entomology 10: 11-32.
DeVries, P.J., Harvey, D.J. & Kitching, I.J., 1986. The ant associated epidermal organs on the larva of the lycaenid butterfly *Curetis regula* Evans.— Journal of Natural History 20: 621-633.
Dickerson, R.E., 1928. Distribution of Life in the Philippines: 1-322.— Manila.
Dos Passos, C.F. & Grey, L.P., 1945. A genitalic survey of the Argynninae (Lepidoptera: Nymphalidae).— American Museum Novitates 1296: 1-29.
Dunn, K.L. & Dunn, L.E., 1991. Review of Australian butterflies: distribution, life history and taxonomy. Parts 1-4: 600 pp.— Melbourne.
Dupont, F. & Scheepmaker, 1936. Uit Java's Vlinderleven: 1-216.— Batavia.

Ehrlich, P.R., 1958. The comparative morphology, phylogeny and higher classification of the butterflies (Lepidoptera: Papilionoidea).— Kansas University Science Bulletin 39: 305-370.
Ehrlich, P.R. & Raven, P.H., 1965. Butterflies and plants: a study in coevolution.— Evolution 18: 586-608.
Eliot, J.N., 1955. Notes on the *Nacaduba hermus* complex (Lepidoptera: Lycaenidae).— Proceedings of the Royal Entomological Society (B) 24: 153-158.
Eliot, J.N., 1956. New and little known Rhopalocera from the Oriental Region.— Bulletin of the Raffles Museum, Singapore 27: 32-38.
Eliot, J.N., 1957. Notes on the genus *Poritia* Moore (Lepidoptera: Lycaenidae).— The Entomologist 90: 70-74.
Eliot, J.N., 1961. An analysis of the genus *Miletus* (Hübner) (Lepidoptera: Lycaenidae).— Bulletin of the Raffles Museum, Singapore 26: 154-177.
Eliot, J.N., 1962. The *Pratapa vidura* (Horsfield) complex (Lepidoptera: Lycaenidae).— The Entomologist 95: 248-250.
Eliot, J.N., 1963. A key to the Malayan species of *Arhopala* Boisduval, 1832.— Malayan Nature Journal 17: 188-217.
Eliot, J.N., 1964a. A note on the *phidippus* L. group of the genus *Amathusia* (Lepidoptera: Amathusiidae), with special reference to the Malayan forms.— The Entomologist 97: 155-161.
Eliot, J.N., 1964b. An analysis of the genus *Deramas* Distant (Lepidoptera: Lycaenidae: Poritiinae).— The Entomologist 97: 241-247.
Eliot, J.N., 1969. An analysis of the Eurasian and Australian Neptini (Lepidoptera: Nymphalidae).— Bulletin of the British Museum (Natural History) (Entomology) Supplement 15: 1-155, 3 pls.
Eliot, J.N., 1970. New *Deramas* from Borneo.— The Entomologist 103: 30-32.
Eliot, J.N., 1972. Some *Arhopala* from Borneo, with a revision of the *Arhopala cleander* group (Lepidoptera: Lycaenidae).— Journal of Natural History 6: 1-15.
Eliot, J.N., 1973. The higher classification of the Lycaenidae: a tentative arrangement.— Bulletin of the British Museum (Natural History) (Entomology) 28: 371-505, 6 pls.
Eliot, J.N., 1986a. The *Horaga albimacula* complex (Lepidoptera: Lycaenidae).— Tyô to Ga 36: 107-111.
Eliot, J.N., 1986b. A review of the Miletini (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History) (Entomology) 53: 1-105.
Eliot, J.N., 1990. Notes on the genus *Curetis* Hübner (Lepidoptera, Lycaenidae).— Tyô to Ga 41: 201-225.
Eliot, J.N. & Kawazoé, A., 1983. Blue butterflies of the *Lycaenopsis* group: 1-309, 6 pls.— London.
Eliot, J.N. & Kirton, L.G., 2000. Revisional notes and nomenclatural changes of some peninsular Malaysian butterflies.— Malayan Nature Journal 54: 131-141.
Evans, W.H., 1932. The identification of Indian butterflies (2nd edn), i-x, 1-454, 32 pls.— Madras.
Evans, W.H., 1934. Indo-Australian Hesperiidae, descriptions of new genera, species and subspecies.— The Entomologist 67: 33-36.
Evans, W.H., 1949. A catalogue of the Hesperiidae from Europe, Asia and Australia in the British Museum (Natural History): i-xix, 1-502, 53 pls.— London.
Evans, W.H., 1954. A revision of the genus *Curetis* (Lepidoptera: Lycaenidae).— The Entomologist 87: 190-194, 212-216, 241-244, 1 pl.
Evans, W.H., 1955. A revision of the genus *Tarucus* (Lepidoptera: Lycaenidae) of Europe, North Africa and Asia.— The Entomologist 88: 179-187.
Evans, W.H., 1957a. A revision of the *Arhopala* group of the Oriental Lycaenidae (Lepidoptera: Rhopalocera).— Bulletin of the British Musuem (Natural History) (Entomology) 5: 85-141.
Evans, W.H., 1957b. Revisional notes on the Hesperiidae of Europe, Asia and Australia.— Annals & Magazin of Natural History (12)9: 749-752.
Fiedler, K., 1991. Systematic, evolutionary, and ecological implications of myrmecophily within the Lycaenidae (Insecta: Lepidoptera: Papilionoidea).— Bonner zoologische Monographien 31: 1-210.
Fiedler, K., 1992a. Notes on the biology of *Hypolycaena othona* (Lepidoptera: Lyacaenidae) in West Malaysia.— Nachrichten des entomologischen Vereins Frankfurt (N.F.) 13: 65-92.
Fiedler, K., 1992b The life-history of *Surendra florimel* Doherty 1889 (Lepidoptera: Lycaenidae) in West Malaysia.— Nachrichten des entomologischen Vereins Frankfurt (N.F.) 13: 107-135.

Fiedler, K., 1993. The remarkable biology of two Malaysian lycaenid butterflies.— Nature Malaysiana 18: 35-43.

Fiedler, K., 1994a. Observations on the biology of *Eooxylides tharis* (Lepidoptera: Lycaenidae).— Nachrichten des entomologischen Vereins Frankfurt (N.F.) 14: 325-337.

Fiedler, K., 1994b. The life-history of *Caleta roxus* (Lepidoptera: Lycaenidae).— Nachrichten des entomologischen Vereins Frankfurt (N.F.) 14: 371-384.

Fiedler, K., 1995. Lycaenid butterflies and plants: is myrmecophily associated with particular host-plant preferences?— Ethology, Ecology & Evolution 7: 107-132.

Fiedler, K., 1996a. Host-plant relationships of lycaenid butterflies: large-scale patterns, interactions with plant chemistry, and mutualism with ants.— Entomologia Experimentalis et Applicata 80: 259-267.

Fiedler, K., 1996b. Interactions between lycaenid butterflies and ants in Peninsular Malaysia. In: D.S. Edwards *et al*. (eds), Tropical Rainforest Research - Current Issues: 291-296.— Dordrecht.

Fiedler, K. & Hagemann, D., 1995. The influence of larval age and ant number on myrmecophilous interactions of the African Grass Blue butterfly, *Zizeeria knysna* (Lepidoptera: Lycaenidae).— Journal of Research on the Lepidoptera 31: 213-232.

Fiedler, K. & Maschwitz, U., 1989. Adult myrmecophily in butterflies: the role of the ant *Anoplolepis longipes* in the feeding and oviposition behaviour of *Allotinus unicolor* (Lepidoptera: Lycaenidae).— Tyô to Ga 40: 241-251.

Fiedler, K. & Seufert, P., 1995. The mature larva and pupa of *Semanga superba* (Lepidoptera: Lycaenidae). — Nachrichten des entomologischen Vereins Frankfurt (N.F.) 16: 1-12.

Fiedler, K., Seufert, P., Maschwitz, U. & Azarae, H.I., 1995. Notes on larval biology and pupal morphology of Malaysian *Curetis* butterflies (Lepidoptera: Lycaenidae).— Tyô to Ga 45: 287-299.

Field, W.D., 1971. Butterflies of the genus *Vanessa* and of the resurrected genera *Bassaris* and *Cynthia* (Lepidoptera: Nymphalidae).— Smithsonian Contributions to Zoology 84: 1-105.

Fleming, W.A., 1983. Butterflies of West Malaysia and Singapore. (2nd edition): i-x, 1-148.— Kuala Lumpur.

Fortuin, A.R. & de Smet, M.E.M., 1991. Rates and magnitudes of late Cenozoic vertical movements in the Indonesian Banda Arc and the distinction of eustatic effects.— Special Publications of the International Association of Sedimentology 12: 79-89.

Freitas, A.V. L. & Brown, K.S. jr, (submitted). Phylogeny of the Nymphalidae (Lepidoptera).— Systematic Biology.

Freitas, A.V.L., Murray, D. & Brown, K.S. 2002. Immatures, natural history and the systematic position of *Bia actorion* (Nymphalidae).— Journal of the Lepidopterists' Society 56: 117-122.

Fric, Z., Konvicka, M. & Zrzavý, J. submitted. Red and black or black and white? Phylogeny of the *Araschnia* butterflies (Lepidoptera: Nymphalidae) and evolution of seasonal polyphenism.

Fujii, H., 1987. Behavior of butterflies in Sabah: Studies on the behavior and life-cycle strategies of arboreal insects in the humid tropics, 1985 (Suppl): 15-44. [Not seen: reference from Seki *et al.* 1991.]

Fujioka, T., 1970. Butterflies collected by the Lepidopterological Research Expedition to Nepal Himalaya, 1963. Part 1. Papilionoidea.— Special Bulletin of the Lepidopterological Society of Japan 4: 1-125.

Fujioka, T. & Chiba, H., 1988. Notes on the distribution of some Japanese butterflies.— Special Bulletin of the Lepidopterological Society of Japan 6: 141-149. [In Japanese, with English summary.]

Fujioka, T., Tsukiyama, H. & Chiba, H., 1997. Japanese butterflies and their relatives in the world I.— Japan.

Fukuda, H. & Nicho, K., 1988. Some problems in the Great Egg-fly, *Hypolimnas bolina* L. (Nymphalidae). Special Bulletin of the Lepidopterological Society of Japan 6:

Fukuda, H., E. Hama, T. Kuzuya, A. Takahashi, M. Takahashi, B. Tanaka, H. Tanaka, M. Wakabayashi & Watanabe, Y., 1992.— The life histories of butterflies in Japan, vol. 3 [2nd ed.]: i-xxii, 1-373.— Osaka.

Fukuda, H. & Igarashi, S , 1997. On the immature stages of *Pseudergolis avesta* C. & R. Felder in Sulawesi, Indonesia (Nymphalidae).— Butterflies, Japan 17: 18-21.

Gabriel, A.G., 1943. A revision of the genus *Ixias* Hübner (Lepidoptera: Pieridae).— Proceedings of the Royal Entomological Society of London (B) 12: 55-70.

Godfray, H.C.J., 2002. Challenges for taxonomy.— Nature 417: 17-19.
Groombridge, B., 1994. 1994 IUCN red list of threatened animals, 48 + 286 pp.— Gland (Switzerland) and Cambridge (UK).
Hall, R., 1998. The plate tectonics of Cenozoic SE Asia and the distribution of land and sea. In: R. Hall and J.D. Holloway (eds), Biogeography and Geological Evolution of SE Asia: 99-131.— Leiden.
Hall, R. 2002. Cenozoic geological and plate tectonic evolution of SE Asia and the SW Pacific: computer-based reconstructions, model and animations.— *Journal of Asian Earth Sciences* 20: 353-431.
Hall, R., Ali, J.R., Anderson, C.D., & Baker, S.J., 1995. Origin and motion history of the Philippine Sea Plate.— Tectonophysics 251: 229-250.
Hall, R. & Blundell, D.J. (eds), 1996. Tectonic evolution of southeast Asia: i-xiii, 1-566.— Bath, UK: Geological Society (special publication no. 106).
Hall, R. & Holloway, J.D. (eds), 1998. Biogeography and Geological Evolution of SE Asia: 1-417.— Leiden.
Hanafusa, H., 1985. Some records of *Polyura* and *Charaxes* from Indonesia.— Iwase 3: 19-20, 2 pls.
Hanafusa, H., 1989. Eleven new subspecies of Indonesian butterflies (Lep.: Papilionidae, Satyridae, Nymphalidae).— Futao 3: 10-13, 4 pls.
Hanafusa, H. 1998. A new subspecies of *Pareronia tritaea* (C. & R. Felder, 1859) from Binongko Is., Tukangbesi Islands, Indonesia (Lepidoptera: Pieridae).— Futao 29: 11-13.
Hancock, D.L., 1979. Systematic notes on *Graphium felixi* (Joicey & Noakes) (Lepidoptera: Papilionidae).— Australian Entomological Magazine 7: 11-12.
Hancock, D.L., 1983a. Phylogeny and relationships of the *Papilio fuscus* group of swallowtails (Lepidoptera: Papilionidae).— Australian Entomological Magazine 9: 63-70.
Hancock, D.L., 1983b. Classification of the Papilionidae (Lepidoptera): a phylogenetic approach.— Smithersia 2: 1-48.
Hancock, D.L., 1984. A note on *Atrophaneura palu* (Martin).— Papilio International, Vejle 1: 71-72.
Hancock, D.L., 1985. Notes on the taxonomy and distribution of Indo-Australian Papilionidae (Lepidoptera).— Australian Entomological Magazine 12: 29-34.
Hancock, D.L., 1988. A revised classification of the genus *Atrophaneura* Reakirt (Lepidoptera: Papilionidae).— Australian Entomological Magazine 15: 7-16.
Hancock, D.L., 1992. The *Princeps fuscus* complex (Lepidoptera: Papilionidae).— Australian entomological Magazine 19: 1-8.
Hancock, D.L., 1993. Origins and evolution of the Afrotropical Papilionidae (Lepidoptera).— Arnoldia, Zimbabwe 9: 557-583.
Harada, M., 1997. Early stages of *Pseudergolis wedah* in Sichuan, China: Butterflies, Japan 17: 15-17.
Harvey, D.J., 1987. *The higher classification of the Riodinidae (Lepidoptera):* i-vii, 1-215 + [1].— PhD thesis, University of Texas at Austin.
Harvey, D.J.,1991. Higher classification of the Nymphalidae. In: H.F. Nijhout, The development and evolution of butterfly wing patterns: 255-273.— Washington.
Haugum, J., 1988. The type specimens of Papilionidae in the Dutch Rijksmuseum, Leiden.— Papilio International, Vejle 5: 327-361.
Haugum, J. & Collins, N.M., 1987. *Papilio hipponous* in the IUCN swallowtail red data book, a correction.— Papilio International, Vejle 3: 207-209.
Haugum, J. & Low, A.M., 1980. The genus *Ornithoptera.* A Monograph of the Birdwing Butterflies, 1: 1-308, 12 pls.— Denmark.
Haugum, J. & Low, A.M., 1981. The *Ornithoptera* updated (Lepidoptera, Papilionidae).— Tokurana, Japan 2: 1-29, 6 pls.
Haugum, J. & Low, A.M., 1985. The genera *Trogonoptera*, *Ripponia* and *Troides*. A monograph of the birdwing butterflies 2: 1-355, 12 pls.— Denmark.
Haugum, J., Ebner, J. & Racheli, T. 1980. The Papilionidae of Sulawesi (Celebes).— Lepidopterists Group 68 Newsletter (supplement 9): 1-21, 1 map, 2 pls.
Häuser, C.,1993. Critical comments on the phylogenetic relationships within the family Papilionidae (Lepidoptera).— Nota lepidopterologica 16: 34-43.
Häuser, C.L., de Jong, R., Lamas, G., Robbins, R.K., Smith, C.R. & Vane-Wright, R.I., 2001. Papilioni-

dae - revised GloBIS/GART species checklist (2nd draft), at www.insects-online.de/gartfron.htm
Hayashi, H., 1978. Lycaenid butterflies from Mindanao, with the descriptions of new genus, new species and new subspecies (Lepidoptera: Lycaenidae).— Tyô to Ga 29: 164-168.
Hayashi, H., 1984. New synonyms, new status, new combinations, new species, and new subspecies of butterflies from the Philippines and Indonesia (Lepidoptera: Satyridae, Riodinidae, Lycaenidae).— Iwase 2: 1-34.
Hemming, F., 1967. The generic names of the butterflies and their type-species (Lepidoptera: Rhopalocera).— Bulletin of the British Museum (Natural History), Entomology, Supplement 9: 1-509.
Henning, S.F., 1983. Biological groups within the Lycaenidae (Lepidoptera).— Journal of the Entomological Society of Southern Africa 46: 65-85.
Henning, S.F., 1989. The Charaxinae butterflies of Africa: i-vii, 1-457, frontispiece.— Johannesburg.
Henning, G.A., Henning, S.F., Joannou, J.G. & Woodhall, S.E., 1997. Living Butterflies of Southern Africa. Biology, Ecology, Conservation. Volume I. Hesperiidae, Papilionidae and Pieridae of South Africa: 1-394.— Hatfield, South Africa.
Heppner, J.B., 1991. Faunal regions and the diversity of Lepidoptera.— Tropical Lepidoptera 2 (Suppl. 1): 1-85.
Hesselbarth, G., van Oorschot, H. & Wagener, S., 1995. Die Tagfalter der Türkei, 3 volumes: 1-754, 755-1354, 1-847, 141 pls, iv+342 maps.— Bocholt, Germany.
Hirowatari, T., 1986a. Study on the genus *Jamides* Hübner (Lepidoptera, Lycaenidae). 1. Descriptions of the female genitalia of sixteen species from the Malay Peninsula.— Tyô to Ga 36: 113-132.
Hirowatari, T., 1986b. Morphology and taxonomic importance of the female genitalia of the genus *Nacaduba* Moore (Lepidoptera, Lycaenidae).— Tyô to Ga 37: 51-60.
Hirowatari, T., 1990. Overview on the genus *Nacaduba* Moore (Lycaenidae).— Yadoriga 142: 2-11.
Hirowatari, T., 1992. A generic classification of the tribe Polyommatini of the Oriental and Australian regions (Lepidoptera, Lycaenidae, Polyommatinae).— Bulletin of the University of OsakaPrefecture (B) 44 (supplement): 1-102.— Osaka, Japan.
Hirowatari, T. & Cassidy, A.C., 1994. A new species of the genus *Jamides* Hübner from Sulawesi, Indonesia (Lepidoptera, Lycaenidae).— Tyô to Ga 45: 1-4.
Holloway, J.D., 1973. The affinities within four butterfly groups (Lepidoptera: Rhopalocera) in relation to general patterns of butterfly distribution in the Indo-Australian area.— Transactions of the Royal Entomological Society of London 125: 126-176.
Holloway, J.D., 1991. Patterns of moth speciation in the Indo-Australian archipelago. In: E.C. Dudley (ed.), The Unity of Evolutionary Biology 1: 340-372.— Portland, Oregon.
Holloway, J.D., 1997. Sundaland, Sulawesi and eastwards: a zoogeographic perspective.— Malayan Nature Journal 50: 207-227.
Holloway, J.D., 2003. Biological images of geological history : through a glass darkly or brightly face to face?— Journal of Biogeography 30: 165-179.
Holloway, J.D., Bradley, J.D. & Carter, D.J., 1987. CIE guides to insects of importance to man, 1, Lepidoptera: 1-262.— Wallingford, Oxon.
Holloway, J.D. & Jardine, N., 1968. Two approaches to zoogeography: a study based on the distribution of butterflies, birds and bats in the Indo-Australian area.— Proceedings of the Linnean Society of London 179: 153-188.
Holloway, J.D., Kibby, G. & Peggie, D., 2001: The families of Malesian moths and butterflies: 1-455.— Leiden.
Holloway, J.D. & Peters, J.V. 1976. The butterflies of New Caledonia and the Loyalty Islands.— Journal of Natural History 10: 273-318.
Hopffer, C., 1874. Beitrag zur Lepidopteren-Fauna von Celebes.— Entomologische Zeitung, Stettin 35: 17-47.
Huxley, T.H., 1868. On the classification and distribution of the Alectoromorphae and Heteromorphae.— Proceedings Zoological Society London 1868: 294-319.
Igarashi, S., 1979. Papilionidae and their early stages, Vol. 1: [1 + 16], 1-223 [+ 32], 102 pls, [1, Vol.2: [1], 1-219.— Tokyo.
Igarashi, S., 1984. The classification of the Papilionidae mainly based on the morphology of their immature stages.— Tyô to Ga 34: 41-96.

Igarashi, S., 1985. The rare butterflies in the World. 7. *Paduca satyrina* Felder.— Yadoriga (121): 23.
Igarashi, S., 1992. New problems on the genus *Choaspes* (Lepidoptera, Hesperiidae).— Butterflies, Japan 1: 20-25.
Igarashi, S. (1994). A collecting trip to Sulawesi - life histories of *Achillides blumei* and *Euthalia amanda*.— Butterflies, Japan 8: 38-43.
Igarashi, S., 1997. *Moduza libnites* (Rhopalocera: Nymphalidae) should be transferred to the genus *Athyma* as *Athyma libnites*.— Butterflies, Japan 17: 11-14.
Igarashi, S. & Fukuda, H., 1997. The life histories of Asian butterflies, Vol. 1: i-xix, 1-550.—Tokyo.
Igarashi, S. & Fukuda, H., 2000. The life histories of Asian butterflies, Vol. 2: i-xxvii, 1-711. Tokyo.
Ishii, T., 1997. A record of *Liphyra brassolis* from North Sulawesi, Indonesia.— Butterflies, Japan 16: 45.
Johnson, S.J. & Valentine, P.S., 1986. Observations on *Liphyra brassolis* Westwood (Lepidoptera: Lycaenidae) in North Queensland.— Australian Entomological Magazine 13: 22-26.
Johnston, G., & Johnston, B., 1980. This is Hong Kong: Butterflies.— Hong Kong.
de Jong, R., 1982a. Secondary sexual characters in *Celaenorrhinus* and the delimitation of the genus (Lepidoptera, Hesperiidae).— Journal of Natural History 16: 695-705.
de Jong, R., 1982b. Notes on the genus *Acerbas* de Nicéville (Lepidoptera: Hesperiidae).— Entomologische Berichten, Amsterdam 42: 88-90.
de Jong, R., 1982c. Neue und wenig bekannte Taxa der Gattung *Hasora* Moore (Lep.: Hesperiidae).— Entomologische Zeitschrift, Frankfurt 92: 33-40.
de Jong, R., 1983. Revision of the Oriental genus *Matapa* Moore (Lepidoptera: Hesperiidae).— Zoologische Mededelingen, Leiden 231: 1-40.
de Jong, R., 1987. Biogeography - what's the question? In: P. Hovenkamp (ed.). Systematics and evolution: a matter of diversity: 251-262.— Utrecht.
de Jong, R., 1990. Some aspects of the biogeography of the Hesperiidae (Lepidoptera: Rhopalocera) of Sulawesi. In: W.J. Knight & J.D. Holloway (eds), Insects and the Rain Forests of South East Asia (Wallacea): 35-42.— London.
de Jong, R., 1991. A note on three species of *Taractrocera* Butler (Lepidoptera: Hesperiidae).— Zoologische Mededelingen, Leiden 65: 257-265.
de Jong, R., 1992. A new species of *Gangara* Moore (Lepidoptera: Hesperiidae), with a note on the genus.— Zoologische Mededelingen, Leiden 66: 183-188.
de Jong, R., 1996. The continental Asian element in the fauna of the Philippines as exemplified by *Coladenia* Moore, 1881 (Lepidoptera: Hesperiidae).— Cladistics 12: 323-348.
de Jong, R., 2001. Faunal exchange between Asia and Australia in the Tertiary as evidenced by recent butterflies. In: I. Metcalfe, J.M.B. Smith, M. Morwood and I. Davidson (eds), Faunal and Floral Migrations and Evolution in SE Asia-Asutralasia: 133-146.— Lisse, The Netherlands.
de Jong, R., 2003. Are there butterflies with Gondwana ancestry in the Australian region?— Invertebrate Systematics 17: 143-156.
de Jong, R., in press. The genus *Taractrocera* Butler (Lepidoptera: Hesperiidae) as an example of Asian-Australian contacts in the Tertiary.— Zoologische Mededelingen, Leiden.
de Jong, R. & Treadaway, C.G., 1992a. Notizen über einige *Erionota*-Arten nebst Beschreibung einer neuen Art.— Entomologische Zeitschrift, Frankfurt 102: 133-142.
de Jong, R. & Treadaway, C.G., 1992b. Revisional notes on *Coladenia* Moore, 1881.— Zoologische Mededelingen 66: 283-293.
de Jong, R. & Treadaway, C.G., 1993a. Notes on South East Asiatic Coeliadinae (Lepidoptera: Hesperiidae).— Nachrichten des entomologischen Vereins Frankfurt (N.F.) 13: 447-455.
de Jong, R. & Treadaway, C.G., 1993b. Notes on the genus *Pirdana* Distant, 1886 (Lepidoptera: Hesperiidae).— Zoologische Mededelingen, Leiden 67: 127-136.
de Jong, R. & Treadaway, C.G., 1993c. The Hesperiidae (Lepidoptera) of the Philippines.— Zoologische Verhandelingen, Leiden 288: 1-125.
de Jong, R. & Treadaway, C.G., 1993d. Neue Arten der Gattung *Halpe* aud den Philippinen (Lepidoptera: Hesperiidae).— Entomologische Zeitschrift, Frankfurt 103: 145-152.
de Jong, R., Vane-Wright, R.I. & Ackery, P.R., 1996. The higher classification of butterflies: problems and prospects.— Entomologica Scandinavica 27: 1-37.

Jordano Barbudo, D., Rodriguez Gonzalez, J., & Fernandez Haeger, J., 1988. *Capparis spinosa* (Capparidaceae): an oviposition substrate for *Lampides boeticus* Linnaeus, in southern Spain (Lepidoptera: Lycaenidae).— Nota Lepidopterologica 10 (1987[1988]): 218-223.

Jurriaanse, J. H. & Lindemans, J., 1920. Bijdrage tot de Kennis de Lepidoptera van Z.O.-Celebes en omliggende eilanden.— Tijdschrift voor Entomologie 62 (Supplement): 1-39, 5 pls.

Kato, S., 1989. Notes on *Papilio demoleus* Linnaeus collected in Jawa, Indonesia (Lepidoptera, Papilionidae).— Tyô to Ga 40: 189-191.

Kimura, Y., 1996. Newly recorded hesperiid butterflies from Thailand since 1985.— Butterflies (Japan) (15): 18-26.

Kirby, W.F., 1871. A synonymic catalogue of Diurnal Lepidoptera: i-viii, 1-690.— London.

Kirchberg, E., 1942. Genitalmorphologie und naturliche Verwandtschaft der Amathusiinae und ihre Beziehungen zur geographischen Verbreitung der Subfamilie.— Mitteilungen der Münchner Entomologischen Gesellschaft 32: 44-87.

Kirton, L. G. & Kirton, C.G., 1987. Butterflies of the Kuala Jasin region, Ulu Endau, Johore, Malaysia.— Malayan Nature Journal 41: 365-377.

Kitahara, H., 1989. A new subspecies of *Papilio peranthus* Fab. from Wangiwangi I., Tukangbesi Is., Indonesia.— Gekkan-Mushi 215: 12.

Kitamura, M. 1996. The study of *Eurema alitha* (C. & R. Felder) (Pieridae) in the Philippines (1).— Butterflies, Japan 13: 3-17.

Kitching, I.J., 1985. Early stages and the classification of the milkweed butterflies (Lepidoptera: Danainae).— Zoological Journal of the Linnean Society 85: 1-97.

Kitching, I.J., Vane-Wright, R.I. & Ackery, P.R. 1987. The cladistics of Ideas.— Cladistics 3: 14-34.

Kitching, I.J., Ackery, P.R. & Vane-Wright, R.I., 1993. Systematic perspectives on the evolution of the monarch butterfly. In: S.B. Malcolm & M. Zalucki (eds), Biology and conservation of the monarch butterfly: 11-16.— Los Angeles.

Kitching, R.L., 1987. Aspects of the natural history of the lycaenid butterfly *Allotinus major* in Sulawesi.— Journal of Natural History 21: 535-544.

Klots, A.B., 1933. A generic revision of the Pieridae (Lepidoptera), together with a study of the male genitalia.— Entomologica Americana 12: 139-242, 9 pls.

Koiwaya, S., 1989. Butterflies collected by the second expedition to China, 1980. In: Koiwaya, S. (ed.). Studies of Chinese Butterflies 1: 76-195.— Tokyo.

Koiwaya, S. (ed.) 1996. Studies on Chenese [sic.] butterflies 3: 1-286.— Tokyo.

Koiwaya, S. & Wakahara, H. 1999. Early stages of some butterflies from Laos (3).— Butterflies, Japan 24: 4-13.

Kotaki, M., 1985. A new subspecies of *Helcyra hemina* from Lesser Sunda.— Iwase 1985: 13-14.

Kristensen, N.P., 1976. Remarks on the family-level phylogeny of the butterflies (Insecta, Lepidoptera, Rhopalocera).— Zeitschrift für Zoologische Systematik und Evolutionsforschung 14: 25-33.

Kristensen, N.P. (ed.), 1999. Handbuch der Zoologie, Vol. IV, part 35, Lepidoptera, Moths and Butterflies: i-x, 1-487.— Berlin & New York.

Kristensen, N.P. & Skalski, A.W. 1999. Phylogeny and palaeontology. In: N.P. Kristensen (ed.). Handbuch der Zoologie, Vol. IV, part 35, Lepidoptera, Moths and Butterflies: 7-25.— Berlin & New York.

Kuroko, H. & Lewvanich, A., 1993. Lepidopterous pests of tropical fruit trees in Thailand: i-iv, 1-133, 52 pls.— Tokyo.

Lamas, G., Nielsen, E.S., Robbins, R.K., Häuser, C.L. & de Jong, R., 2000. Developing and sharing data globally: the 'Global Butterfly Information System' - GloBIS.— Abstracts XXI International Congress of Entomology 1: 196.

Lamas, G., Häuser, C., de Jong, R., Nielsen, E., Robbins, R.K. & Vane-Wright, R.I., in prep. Global standards for higher classification and family group names of the butterflies (Lepidoptera)

Larsen, T.B., 1982. The butterflies of the Yemen Arab Republic (with a review of species in the *Charaxes viola*-group from Arabia and East Africa, by A. H. B. Rydon).— Det Kongelige Danske Videnskabernes Selskab Biologiske Skrifter 23(3): 1-87.

Larsen, T.B., 1991. The butterflies of Kenya and their natural history: i-xxii, 1-490, 64 pls.— Oxford.

Lee, C., 1966. On the Chinese species of *Borbo* Evans (Lep.: Hesperiidae).— Acta Zoologica Sinica 18: 228.

Lees, D.C., Kremen, C., & Raharitsimba, T., in press. Butterflies: checklist, classification, diversity, and endemism. In: S.M. Goodman & J. Benstead (eds), The Natural History of Madagascar.— Chicago.

Le Moult, E., 1950. Revision de la classification des Apaturinae de l'ancien monde suivie d'une monographie de plusieurs genres.— Miscellanea Entomologica (Supplement): 1-68, 19 pls.

Margules, C.R. & Pressey, R.L., 2000. Systematic conservation planning.— Nature 405: 243-253.

Martin, L., 1914-1920. Die Tagfalter der Insel Celebes.— Deutsche Entomologische Zeitschrift Iris, Dresden 28: 59-107; 29: 4-19, 50-90; 33: 48-98; 34: 181-210.

Martin, L., 1920-1924. Die Tagfalter der Insel Celebes. Eine kritische Studie mit einigen Neubeschreibungen.— Tijdschrift voor Entomologie 63: 111-159; 67: 32-116.

Martin, L., 1929. Die Tagfalter der Insel Celebes.— Mitteilungen der Münchner Entomologischen Gesellschaft 19: 117-164 (Teil 8: Satyriden), 371-380 (Fam. Amathusiidae).

Maruyama, K., 1989. Two new species and four new subspecies of hesperiid butterflies from the islands of Southeast Asia.— Kanagawa-Chûhô 90: 109-122.

Maruyama, K., 1991. Hesperiidae. Butterflies of Borneo 2 (2): i-xiii, 1-82 [Japanese]; i-ix, 1-77 [English]; 40 pls.— Tokyo.

Maruyama, K., 2000. Some notes on hesperiid butterflies of South-East Asia (1).— Butterflies, Japan 27: 4-11.

Maschwitz, U., Schroth, M., Hanel, H. & Tho, Y-P., 1984. Lycaenids parasitizing symbiotic plant-ant partnerships.— Oecologia 64: 78-80.

Maschwitz, U., Dumpert, K. & Sebastian, P., 1985a. Morphological and behavioural adaptations of homopterophagous blues (Lepidoptera: Lycaenidae).— Entomologia Generalis 11: 85-90.

Maschwitz, U., Schroth, M., Hanel, H. & Tho, Y-P., 1985b. Aspects of the larval biology of myrmecophilous lycaenids from West Malaysia (Lepidoptera).— Nachrichten des Entomologischen Vereins Apollo, Frankfurt (N.F.) 6: 181-200.

Maschwitz, U., Nassig, W.A., Dumpert, K. & Fiedler, K., 1988. Larval carnivory and myrmecoxeny, and imaginal myrmecophily in miletine lycaenids (Lepidoptera, Lycaenidae) on the Malay Peninsula.— Tyô to Ga 39: 167-181.

Masui, A., 1999. A new subspecies of *Helcyra celebensis* (Lepidoptera, Nymphalidae) from Buton Island, Indonesia.— Transactions of the Lepidopterological Society of Japan 50: 264-266.

Masui, A. & Inomata, T., 1992. Apaturinae of the world (Lepidoptera, Nymphalidae) - 4 - [*Helcyra*].— Yadoriga 151: 11-22.

Matsuka, H., 2001. Natural History of Birdwing Butterflies: 1-367.— Tokyo.

Megens, H.-J., 2002. Understanding the diversity of the speciose tropical butterfly genus *Arhopala*, a molecular phylogenetic approach: 1-151.— PhD thesis, Leiden.

Mey, W., 2003. Insular radiation of the genus *Hydropsyche* (Insecta, Trichoptera: Hydropsychidae) Pictet, 1834 in the Philippines and its implications for the biogeography of Southeast Asia.— Journal of Biogeography 30: 227-236.

Michener, C.D., 1942. A generic revision of the Heliconiinae.— American Museum Novitates 1197: 1-8.

Miller, J.S., 1987. Phylogenetic studies in the Papilionidae (Lepidoptera: Papilionidae).— Bulletin of the American Museum of Natural History 186: 365-512.

Miller, L.D., 1968. The higher classification, phylogeny and zoogeography of the Satyridae.— Memoirs of the American Entomological Society 24: [i-vi], i-iii, 1-174.

Moonen, J.J.M., 1991. *Papilio demoleus* L. in Java (Lepidoptera: Papilionidae).— Tyô to Ga 42: 93-94.

Moonen, J.J.M., 1998. Notes on some Papilionidae (Lepidoptera) from Indonesia.— Tyô to Ga 49: 219-228.

Moonen, J.J.M., 1999. *Papilio demoleus* L. (Lepidoptera, Papilionidae) in West Irian.— Transactions of the Lepidopterological Society of Japan 50: 82-84.

Morishita, K., 1981. Danaidae. In: E. Tsukada (ed.). Butterflies of the South-East Asian Islands 2: 439-628, 78 pls.— Tokyo.

Morishita, K., 1995. Two Sino-Himalayan nymphalid butterflies and their phylogenetic positions.— Butterflies, Japan 10: 41-46.

Morishita, K., 1997. *Hestina assimilis* and its allies (Nymphalidae: Apaturinae).— Butterflies, Japan 16: 34-44.

Morley, R.J., 2000. Origin and Evolution of Tropical Rain Forests, i-xv, 1-362.— Chichester.

Morrell, R., 1960. Common Malayan Butterflies: i-xii, 1-64, 20 pls.— London.

Moss, S.J. & Wilson, M.E.J., 1998. Biogeographic implications of the Tertiary palaeographic evolution of Sulawesi and Borneo. In: R. Hall and J.D. Holloway (eds), Biogeography and Geological Evolution of SE Asia: 133-163.— Leiden.

Motono, A. & Negishi, N., 1989. Butterflies of Laos: 1-215.— Tokyo.

Müller, A., 1994. Eine neue Subspecies von *Euthalia aconthea* Cramer aus Sulawesi (Lepidoptera: Nymphalidae).— Entomologische Zeitschrift, Frankfurt 104: 102-104.

Munroe, E., 1961. The classification of the Papilionidae (Lepidoptera).— Canadian Entomologist, Supplement 17: 1-51.

Nakanishi, A. 1988. Study on the first instar larvae of the subfamily Nymphalinae (Lepidoptera, Nymphalidae).— Special Bulletin of the Lepidopterological Society of Japan 6: 83-90.

New, T.R. & Collins, N.M., 1991. Swallowtail butterflies: an action plan for their conservation: i-iv, 1-36.— Gland, Switzerland.

Nguyen-Phung, T., 1985. Systematique évolutive et biogéographie du genre *Rohana* Moore (Lepidoptera: Nymphalidae).— Nouvelle Revue d'Entomologie, Toulouse (N.S.) 2: 175-191.

de Nicéville, L. & Martin, L., 1896. A list of the butterflies of Sumatra with especial reference to the species occurring in the north-east of the island.— Journal of the Asiatic Society of Bengal [II] 64 : 357-555.

Nielsen, E.S., 1989. Phylogeny of major lepidoptera groups. In: B. Fernholm, K. Bremer & H. Jornvall (eds), The Hierarchy of Life: 281-294.— Amsterdam.

Nielsen, E.S. & Common, I.F.B., 1991. Lepidoptera (moths and butterflies). In: CSIRO (ed.). The Insects of Australia (2nd ed.) 2: 817-915.— Carlton, Victoria.

Nieuwenhuis, E.J., 1946. Lepidoptera van den Banggai-archipel.— Tijdschrift voor Entomologie 87: 37-61, 1 pl.

Nieuwenhuis, E.J., 1959. On the female of *Charaxes mars mars* Stgr. 1886 (Lepidoptera, Nymphalidae).— Entomologische Berichten, Amsterdam 19: 37-40.

Nieuwenhuis, E.J., 1962. Over de *Vindula*-species van de Indonesche archipel en op Nieuw-Guinea.— Entomologische Berichten, Amsterdam 22: 69-76.

Nuyda, J.S. & Kitamura, M., 1993a. A short report on *Phrissura aegis* C and R Felder (Lepidoptera: Pieridae).— Fil-Kulisap, Insect Society of the Philippines, Metro Manila 1 (2): 15-18.

Nuyda, J.S. & Kitamura, M., 1993b. On the female of *Terinos romeo* Schröder & Treadaway (Lepidoptera: Nymphalidae).— Fil-Kulisap, Insect Society of the Philippines, Metro Manila 1 (2): 18-19, 21.

Nylin, S., Nyblom, K., Ronquist, F., Janz, N., Belicek, J. & Källersjö, M., 2001. Phylogeny of *Polygonia*, *Nymphalis* and related butterflies (Lepidoptera: Nymphalidae): a total-evidence analysis.— Zoological Journal of the Linnean Society 132: 441-468.

Ohnishi, N. & Sugimoto, S. 1998. A new record of *Hypolimnas alimena* (Linnaeus, 1758) from Tukang Besi Islands, Indonesia (Lepidoptera: Nymphalidae).— Futao 28: 20.

Okano, K., 1985. Description of a new subspecies of the mysterious danaid butterfly, *Idea tambusisiana* (Danaidae).— Tokurana 9: 59-66.

Okano, K., 1987. A checklist of libytheid butterflies in the world, with some bibliographical observations.— Tokurana 13(1): 1-12.

Okano, K., 1988. Four new subspecies of butterflies (Lep., Rhopalocera) from Indonesia, Philippines and Papua New Guinea, with some notes on Indonesian butterflies.— Tokurana 13(3): 1-10.

Okano, K., 1989. New or undescribed butterflies of *Delias* (Lep.: Pieridae) from Celebes.— Tokurana 15(1): 1-4.

Osada, S., 1987. Two new species of Poritiinae from Sulawesi, Indonesia (Lepidoptera: Lycaenidae).— Memoirs of the Tsukada Collection, Japan (5): 54-57, 1 pl.

Osada, S., 1994. A further contribution to a knowledge on Poritiinae from Sulawesi, Indonesia (Lep.: Lycaenidae).— Futao 15: 5-13.

Osada, S., 1997. Miscellaneous note on the early stages of some butterflies in Laos P.D.R.— Butterflies, Japan 17: 33-37.

Osada, S., 2001. A new species of Lycaenidae (Lepidoptera), *Horaga sohmai*, from Sulawesi, Indonesia.— Transactions of the Lepidopterological Society of Japan 52: 183-186.

Osada, S., Uémura, Y. and Uehara, J., 1999. An illustrated checklist of the butterflies of Laos P.D.R.: 1-239.— Tokyo.

Otsuka, K., 1988. Butterflies of Borneo 1: i-xx, [i], 1-61 [Japanese]; i-xix, [i], 1-62 [English]; 80 pls.— Tokyo.

Otsuka, K., 1991. Addendum. Addition and correction to Volume 1. Butterflies of Borneo 2 (2): 83-89 [Japanese]; 79-83 [English], 8 pls.— Tokyo.

O[h]tsuka, K., 1996. Bornean butterflies examined through distribution.— Fujimura High School Bulletin, Japan: 1-52.

Page, M.[G.P.], 1987. Notes on the classification of the *antiphates*-group of *Graphium* Scopoli 1777.— Papilio International, Vejle 4: 227-250, 5 pls.

Page, M.G.P. & Treadaway, C.G., 1995. Revision of the classification of *Pachliopta aristolochiae* (Fabricius, 1775) (Lepidoptera, Papilionidae) with special reference to the Philippine Islands.— Nachrichten des entomologischen Vereins Apollo, Supplement 14: 125-148.

Pagenstecher, A., 1901. Libytheida.—Das Tierreich (14): i-x, 1-14, 4 pls.

Pan, T. & Morishita, K., 1990. Notes on *Nacaduba normani* Eliot in Sabah, North Borneo.— Tyô to Ga 41: 149-154.

Parsons, M.J., 1986. A new genus and twenty-six new species of butterflies (Lepidoptera: Hesperiidae, Lycaenidae, Nymphalidae) from Papua New Guinea and Irian Jaya.— Tyô to Ga 37: 103-177.

Parsons, M.J., 1989. Taxonomic studies in New Guinea and Solomons Nymphalidae (Lepidoptera: Rhopalocera), and discovery of abdominal scent organs in the females of various Nymphalinae genera.— Bishop Museum Occasional Papers 29: 174-192.

Parsons, M., 1991. Butterflies of the Bulolo-Wau valley. Handbook No. 12 of the Wau Ecology Institute: 1-280, 22 colour and 3 b/w pls.— Honolulu.

Parsons, M., 1996a. Gondwanan evolution of the troidine swallowtails (Lepidoptera: Papilionidae): cladistic reappraisals using mainly immature stage characters, with focus on the birdwings *Ornithoptera* Boisduval.— Bulletin of the Kitakyushu Museum of Natural History (15): 43-118.

Parsons, M.J., 1996b. A phylogenetic reappraisal of the birdwing genus *Ornithoptera* (Lepidoptera: Papilionidae: Troidini) and a new theory of its evolution in relation to Gondwanan vicariance biogeography.— Journal of Natural History 30: 1707-1736.

Parsons, M., 1999. Butterflies of Papua New Guinea. Their systematics and biology: i-xvi, 1-737 + [1], 26 + 139 pls.— San Diego and London.

Peggie, D., Vane-Wright, R.I. & Yata, O., 1995. An illustrated checklist of the pierid butterflies of northern and central Maluku (Indonesia).— Butterflies, Japan 11: 23-47.

Pelzer, A., 1991. *Tecoma* (Bignoniaceae) - an unusual larval foodplant of *Lampides boeticus* L. (Lepidoptera: Lycaenidae).— Nota lepidopterologica 14: 100.

Penz, C.M. & Peggie, D. submitted. Phylogenetic relationships among Heliconiinae genera based on morphology (Lepidoptera, Nymphalidae).— Systematic Entomology.

Piepers, M.C., & Snellen, P.C.T., 1910. The Rhopalocera of Java. Hesperiidae: i-xxvi, 1-60, 6 pls.— The Hague.

Pierce, N.E., Braby, M.F., Heath, A., Lohman, D.J., Mathew, J., Rand, D.B., & Travassos, M.A., 2002. The Ecology and Evolution of Ant Association in the Lycaemidae (Lepidoptera).— Annual Review of Entomology 47: 733-771.

Pierre, J., 1984. Systematique evolutive cladistique et mimetisme chez les lepidopteres de genre *Acraea*.— DSc thesis, University of Paris.

Pierre, J., 1987. Systematique cladistique chez les *Acraea* (Lepidoptera, Nymphalidae).— Annales de la Société Entomologique de France (N.S.) 23: 11-27.

Pinratana, Bro. A., 1974. Butterflies in Thailand. Vol. 1, Papilionidae and Danaidae: i-xii, 1-91.— Bangkok.

Pinratana, Bro. A., 1975. Butterflies in Thailand. Vol. 2, Pieridae and Amathusiidae: i-iv, 1-130.— Bangkok.

Pinratana, Bro. A., 1979. Butterflies in Thailand. Vol. 3, Nymphalidae: i-xxxiv, 1-112.— Bangkok.

Pinratana, Bro. A., 1981. Butterflies in Thailand. Vol. 4, Lycaenidae: i-viii, 1-216, 32 pls.— Bangkok.

Pinratana, Bro. A., 1985. Butterflies in Thailand. Vol. 5, Hesperiidae: i-vi+, 1-52, 40 pls.— Bangkok.

Pinratana, A. & Eliot, J.N., 1996. Butterflies in Thailand. Vol. Three. Nymphalidae (2nd and revised edition): i-vii, 1-140, 84 pls.— Bangkok.

Pitkin, B. & Jenkins, P. Butterflies & Moths of the World. Generic Names and their Type-species.— http://www.nhm.ac.uk/entomology/butmoth/index.html.

Rammlmair, D., 1993. The Evolution of the Philippine Archipelago in Time and Space: a Plate-Tectonic Model.— Geologisches Jahrbuch B, 81: 3-48.

Rangin, G., Jolivet, L. & Pubellier, M., 1990. A sinple model for the tectonic evolution of the southeast Asia and Indonesia region for the past 43 m.y.— Bulletin de la Société géologique de France 8: 889-905.

Riley, N.D. & Corbet, A.S., 1938. A revision of the Malayan species of *Jamides* Hübner.— Transactions of the Royal Entomological Society of London 87: 147-159.

Robinson, G.S., Tuck, K.R. & Shaffer, M., 1994. A field guide to the smaller moths of South-east Asia.— Kuala Lumpur.

Robinson, G.S., Ackery, P.R., Kitching, I.J., Beccaloni, G.W. & Hernández, L.M. 2001. Hostplants of the moth and butterfly caterpillars of the Oriental Region: 1-744.— Kuala Lumpur.

Röber, J., 1940. Die Tagfalter der Insel Celebes.— Deutsche Entomologische Zeitschrift Iris, Dresden 53: 89-117.

Roepke, W., 1935-1942. Rhopalocera Javanica. 4 parts: 1-453, 42 pls.— Wageningen.

Roos, P.H., 1992. Nachweis von *Zethera incerta* (Hewitson, 1861) für Südost-Sulawesi (Indonesien) und Charakterisierung der neuen Subspezies (Lep., Nymphalidae, Satyrinae).— Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 44: 87-94.

Roos, P.H., 1993. Verbreitungsnachweise von Rhopalocera-Arten der Insel Sulawesi, Indonesien, ausserhalb ihrer bis jetz bekannten Areale 1. Papilionidae, Danaidae, Satyridae (Lepidoptera).— Entomologische Zeitschrift, Frankfurt 103: 261-280.

Roos, P.H., 1995. Verbreitungsnachweise von Rhopalocera-Arten der Insel Sulawesi, Indonesien, ausserhalb ihrer bis jetz bekannten Areale, 2 (Lepidoptera: Papilionidae, Pieridae, Nymphalidae, Danaidae, Satyridae).— Entomologische Zeitschrift, Frankfurt 105: 57-76.

Roos, P.H., 1996. Eine neue Art der Gattung *Cirrochroa* Doubleday aus Südost-Sulawesi, Indonesien (Lepidoptera: Nymphalidae).— Entomologische Zeitschrift, Frankfurt 106: 30-36.

Rydon, A.H.B., 1971. The systematics of the Charaxidae.— Entomologist's Record & Journal of Variation 83: 219-233, 283-287, 310-316, 336-341, 384-388.

Saigusa, T., Nakanishi, A., Shima, H. & Yata, O., 1982. Phylogeny and geographical distribution of the swallowtail subgenus *Graphium* (Lepidoptera: Papilionidae).— Entomologia Generalis 8: 59-69.

Samson, C., 1976. A new subspecies of *Argynnis hyperbius* (Nymphalidae) from New Guinea.— Journal Lepidopterists' Society 30: 12-15.

Samson, C. & Smart, P., 1980. A review of the genus *Liphyra* (Lepidoptera: Lycaenidae) of Indo-Australia, with descriptions of two new subspecies from the Solomon Archipelago.— Aurelian 1(4): 6-16.

Sands, D.P.A., 1986. A revision of the genus *Hypochrysops* C. & R. Felder (Lepidoptera: Lycaenidae): Entomonograph 7: 1-116, 2 pls.— Leiden.

Schreiner, I.H. & Nafus, D.M. 1991. Evolution of sub-social behaviour in the nymphalid butterfly *Hypolimnas anomala*.— Ecological Entomology 16: 261-264.

Schroeder, H.G. & Treadaway, C.G., 1986. Neue Taxa in den Gattungen *Eliotia*, *Deramas* und *Una* (Lepidoptera: Lycaenidae).— Entomologische Zeitschrift, Frankfurt 96: 312-319.

Schroeder, H.G., Treadaway, C.G., Schroeder, I. & Nuyda, J., 2001. Zur Kenntnis philippinischer Taxa des Genus *Horaga* Moore 1881.— Nachrichten des entomologische Vereins Apollo N.F. 22: 109-118.

Scoble, M.J., 1986. The structure and affinities of the Hedyloidea: a new concept of the butterflies (Lepidoptera).— Bulletin of the British Museum (Natural History) (Entomology) 53: 251-286.

Scoble, M.J., 1990. An identification guide to the Hedylidae (Lepidoptera: Hedyloidea).— Entomologica Scandinavica 21: 121-158.

Scoble, M.J., 1992. The Lepidoptera: form, function and diversity: i-xi, 1-404.— Oxford.

Scoble, M.J. & Aiello, A., 1990. Moth-like butterflies (Hedylidae: Lepidoptera): a summary, with comments on the egg.— Journal of Natural History 24: 159-164.

Scott, J.A., 1986. On the monophyly of the Macrolepidoptera, including a reassessment of their relationships to Cossoidea and Castnioidea, and a reassignment of Mimallonidae to Pyraloidea.— Journal of Research on the Lepidoptera 25: 30-38.

Scriber, J.M., Tsubaki, Y. & Lederhouse, R.C. (eds), 1994. Swallowtail butterflies: ecology and evolutionary biology: 1-459.— Gainesville.

Seki, Y., 1997. A concise guide for the identification of *Tajuria* (Lepidoptera, Lycaenidae) and its allies with description of new subspecies (1).— Butterflies, Japan 18: 46-53.

Seki, Y. & Takanami, Y., 1990. The treasure box of South East Asia (1): descriptions of new Lycaenidae from Borneo and Sumatra.— Gekkan-Mushi 231: 3-9.

Seki, Y., Takanami, Y. & Otsuka, K., 1991. Lycaenidae. Butterflies of Borneo 2 (1): i-x, 1-139 [Japanese]; i-x, 1-114 [English]; [70+2] pls.— Tokyo.

Semper, G., 1873. Die Wanderung von *Danais erippus*, Cramer, nach dem Sudseeinseln, Australien und Celebes.— Journal des Museum Godeffroy, Hamburg 1: 293-295.

Seufert, P., 1997. Bläulinge auf *Saraca thaipingensis* - eine Fallstudie zu diversitätserhaltenden Faktoren im Tropischen Regenwald.— Ph.D. thesis, University of Würzburg.

Seufert, P. & Fiedler, K., 1996a. Life-history diversity and local co-existence of three closely related lycaenid butterflies (Lepidoptera: Lycaenidae) in Malaysian rainforests.— Zoologischer Anzeiger 234: 229-239.

Seufert, P. & Fiedler, K., 1996b. The influence of ants on patterns of colonization and establishment within a set of coexisting lycaenid butterflies in a south-east Asian tropical rain forest.— Oecologia 106: 127-136.

Shields, O., 1985. Zoogeography of the Libytheidae (snouts or breaks [sic!]).— Tokurana 9: 1-58.

Shields, O., 1989a. World numbers of butterflies.— Journal of the Lepidopterists' Society 43: 178-183.

Shields, O., 1989b. Systematic position of Libytheidae, diphylogeny of Rhopalocera, and heteroceran ancestry of Rhopalocera (Lepidoptera).— Tyô to Ga 40: 197-228.

Shima, H. 1988. Phylogenetic relationships of the genus *Ypthima* Hübner (Lepidoptera, Satyridae).— Special Bulletin of the Lepidopterological Society of Japan 6: 69-81.

Shimonoya, T. & Murayama, S., 1976. Remarks on some Formosan Rhopalocera with descriptions of two new species, and the revision of a few scientific names.— Tyô to Ga 27: 43-48.

Shirôzu, T. 1960. The butterflies of Formosa [in Japanese].— Osaka.

Shirôzu, T. & Saigusa, T, 1962. Butterflies collected by the Osaka City University Biological Expedition to Southeast Asia 1957-58 (Part I).— Nature & Life Southeast Asia, Kyoto 2: 25-94.

Shirôzu, T. & Shima, H., 1979. On the natural groups and their phylogenetic relationships of the genus *Ypthima* Hübner mainly from Asia (Lepidoptera: Satyridae).— Sieboldia 4: 231-295.

Shirôzu, T. & Yamamoto, H., 1957. Systemetic position of the genus *Curetis* (Lepidoptera: Rhopalocera).— Sieboldia 2: 44-51.

Smiles, R.L., 1973. Revisional notes on the genera *Cyllogenes* Butler, *Gnophodes* Doubleday, and *Parantirrhoea* Wood-Mason (Lepidoptera: Satyridae).— The Entomologist 106: 172-182, 2 pls.

Smiles, R.L., 1982. The taxonomy and phylogeny of the genus *Polyura* Billberg (Lepidoptera: Nymphalidae).— Bulletin of the British Museum (Natural History) (Entomology) 44: 115-237.

Smith, C., 1994. Butterflies of Nepal (revised edition): 1-367.— Bangkok.

Stehr, F.W., 1987. Immature insects, Vol. 1: i-xiv, 1-754.— Dubuque.

Stichel, H., 1912. Amathusiidae.— Das Tierreich (34): i-xv, 1-248.

Takanami, Y., 1985. A revisional note on genus *Iraota* of the Philippines and Celebes (Lep.: Lycaenidae).— Tokurana Special (1): 1-12.

Takanami, Y., 1986a. A list of Lycaenidae from Flores in the Lesser Sunda Islands.— Gekkan-Mushi 187: 7-14.

Takanami, Y., 1986b. New records of *Una usta* (Distant) and *Loxura atymnus* (Stoll) from Sulawesi (Lepidoptera, Lycaenidae).— Gekkan-Mushi 189: 23-25.

Takanami, Y., 1987. A list of Lycaenidae (Lepidoptera) from Kepulauan Talaud in Indonesia.— Gekkan-Mushi 191: 27-31.

Takanami, Y., 1989. On some type specimens of Lycaenidae from South East Asia (Lepidoptera).— Tyô to Ga 40: 23-80.

Takanami, Y., 1990. Miscellaneous notes on Lycaenidae (Lepidoptera) from South-east Asia (1).— Tyô to Ga 41: 67-78.

Takanami, Y., 1992a. Notes on some species of the genus *Rapala* (Lepidoptera: Lycaenidae) from Sulawesi, with the description of a new species.— Tyô to Ga 43: 193-202.

Takanami, Y., 1992b. On some type specimens of *Nacaduba* and *Prosotas* (Lepidoptera, Lycaenidae) preserved in the Staatliches Museum für Tierkunde, Dresden.— Tyô to Ga 43: 47-52.

Takanami, Y., 1998. Genus *Rapala* (Lycaenidae) of the southeast Asian islands.— Butterflies, Japan 19: 41-57.

Talbot, G., 1928-1937. A monograph of the Pierine genus *Delias*.— London.

Talbot, G., 1943. The *lubentina* group of the genus *Euthalia* Hübner (Lepidoptera: Nymphalidae).— Proceedings of the Royal Entomological Society of London (B) 12: 37-41.

Tennent, W.J., 1996a. A strange record of the African lycaenid butterfly *Cupidopsis jobates* Hopffer, 1855, from Sulawesi, Indonesia (Lepidoptera, Lycaenidae).— Transactions of the Lepidopterological Society of Japan 47: 123-124.

Tennent, [W.]J., 1996b. The butterflies of Morocco, Algeria and Tunisia: i-xxxvi , 1-217.— Wallingford, Oxon, UK.

Tennent, J.T., 2002. Butterflies of the Solomon Islands: systematics and biogeography: i-xxiii, 1-413.— Dereham, Norfolk.

Teshirogi, M., 1990. An illustrated book of Japanese Nymphalidae: i-xi, 1-109, 80 pls.— Tokai, Japan.

Teshirogi, M., 2001. Immature stages of two butterflies from Sulawesi.— Butterflies, Japan 29: 54-57.

Tite, G.E., 1959. The genus *Catochrysops* (Lepidoptera: Lycaenidae).— The Entomologist 92: 201-212, 2 pls.

Tite, G.E., 1963. A synonymic list of the genus *Nacaduba* and allied genera (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History), Entomology 13: 67-116, 2 pls.

Tite, G.E., 1966. A revision of the genus *Anthene* from the Oriental Region (Lepidoptera: Lycaenidae).— Bulletin of the British Museum (Natural History), Entomology 18: 253-275, 2 pls.

Toxopeus, L.J., 1930. De soort als functie van plaats en tijd, getoetst aan de Lycaenidae van het Australaziatisch gebied: 1-198.— Amsterdam.

Toxopeus, L.J., 1950. The geological principles of species evolution in New Guinea: Eighth International Congress of Entomology, Proceedings: 508-522.— Stockholm.

Treadaway, C.G., 1995. Checklist of the butterflies of the Philippine Islands (Lepidoptera: Rhopalocera).— Nachrichten des entomologische Vereins Apollo, Supplement 14: 7-118.

Tsukada, E., 1985. Nymphalidae (1), in Tsukada, E. (ed.). Butterflies of the South East Asian Islands 4: 1-558.— Tokyo.

Tsukada, E., 1991. Nymphalidae (2), in Tsukada, E. (ed.). Butterflies of the South East Asian Islands 5: 1-576.— Tokyo.

Tsukada, E. & Nishiyama, Y., 1982. Papilionidae (translated into English by K. Morishita). In: E. Tsukada (ed.). Butterflies of the South East Asian Islands 1: 1-457.— Tokyo [First published in 1980, in Japanese.]

Tsukiyama, H., 1985. Leon Croizat no Hanashi [On the biologist Leon Croizat; includes partial cladistic analysis of *Bibasis*].— Tsu i So, Tokyo 447: 125-133. [In Japanese.]

Tsukiyama, H., 1992. Genus *Choaspes* Moore, a review (Lepidoptera: Hesperiidae) - with illustrations of all taxa and new information up to 1991.— Butterflies, Japan 2: 26-38.

Tsukiyama, H. & Chiba, H., 1991. A new species and subspecies of skippers from Sulawesi, Indonesia (Lepidoptera, Hesperiidae).— Tyô to Ga 42: 255-260.

Tsukiyama, H. & Chiba, H., 1994. A review of the genus *Odina* Mabille, 1891 (Lepidoptera: Hesperiidae).— Butterflies, Japan 8: 30-33.

Turner, H., Hovenkamp, P. & van Welzen, P.C. 2001. Biogeography of Southeast Asia and the West Pacific.— Journal of Biogeography 28: 217-230.

Tyler, H.A., Brown, K.S. jr & Wilson, K.H., 1994. Swallowtail butterflies of the Americas: 1-376, endpapers.— Gainesville.

Uémura, Y., 1982. Studies on the Celebesian *pandocus*-group Shirôzu & Shima, 1979, section of the satyrid genus *Ypthima* Hübner (Lepidoptera).— Memoirs of the Tsukada Collection, Japan (4): 38-44, 2 pls.

Uémura, Y., 1985a. A revision of the Asian *asterope*-group of the genus *Ypthima* Hübner (Lepidoptera: Satyridae).— Tyô to Ga 35: 174-188.

Uémura, Y., 1985b. Identification guide to the Thai-Malayan species of the *mineus*-group of *Mycalesis* (Lepidoptera: Satyridae).— Yadoriga (123): 2-9.

Uémura, Y., 1987. Description of a new species of the genus *Bletogona* Felder (C.) & Felder (R.) (Lepidoptera: Satyridae).— Memoirs of the Tsukada Collection, Japan (5): 18-22, 1 pl.

Uémura, Y., 1993. Descriptions of two hitherto unknown females of satyrid butterflies from Sulawesi (Celebes) and Kabaena, Indonesia (Lepidoptera: Satyridae).— Bulletin of the Toyosato Museum of Entomology 2: 1-4.

Uémura, Y., 1999. Revisional notes on Oriental satyrid butterflies (Lepidoptera : Satyridae). Part 2. Description of a new species of the genus *Ypthima* Hübner from Sulawesi (Celebes), Indonesia.— Bulletin of the Toyosato Museum of Entomology 8 : 1-4.

Uémura, Y. & Yamaguchi, S., 1982. A revisionary study on the genus *Acrophtalmia* Felder (C.) & Felder (R.) (Lepidoptera: Satyridae).— Memoirs of the Tsukada Collection, Japan (4): 26-37, 2 pls.

Uesugi, K., 1984. On the butterfly fauna of the Ryukyu Islands. 1. Hateruma Island.— The Biological Magazine Okinawa 22: 47-56.

Vane-Wright, R.I. 1972. Pre-courtship activity and a new scent organ in butterflies.— Nature 239: 338-340.

Vane-Wright, R.I., 1978. Ecological and behavioural origins of diversity in butterflies.— Symposia of the Royal Entomological Society of London (9): 56-70.

Vane-Wright, R.I., 1990. The Philippines-key to the biogeography of Wallacea? In: W.J. Knight & J.D. Holloway (eds), Insects and the rain forests of South East Asia (Wallacea): 19-34. - London.

Vane-Wright, R.I., 1991. Transcending the Wallace Line: do the western edges of the Australian Region and the Australian Plate coincide?— Australian Systematic Botany 4: 183-197.

Vane-Wright, R.I., 1993a. The Columbus hypothesis: an explanation for the dramatic 19th century range expansion of the monarch butterfly. In: S.B. Malcolm & M. Zalucki (eds), Biology and conservation of the monarch butterfly: 179-187.— Los Angeles.

Vane-Wright, R.I., 1993b. Milkweed butterflies (Lepidoptera: Danainae) and conservation priorities in the Andaman and Nicobar islands, India.— Butterflies, Japan 4: 21-33.

Vane-Wright, R.I., 1995. Ellis Rowan's butterflies and moths of New Guinea, sold in aid of the Merlin Trust [with an introduction by Nicholas Lambourn]. In: Watercolours and Pictures of Birds and Ellis Rowan's Butterflies and Moths of New Guinea [sale catalogue]: 125-153.— London.

Vane-Wright, R.I. in press (a). Evidence and identity in butterfly systematics. In: C.L. Boggs, W.B. Watt & P.H. Ehrlich (eds), Ecology and evolution taking flight: butterflies as model systems: 477-513.— Chicago.

Vane-Wright, R.I., in press (b). Indifferent philosophy *versus* Almighty Authority: on consistency, consensus and unitary taxonomy.— Systematics and Biodiversity 1.

Vane-Wright, R.I. & Ackery, P.R. (eds), 1989. The Biology of Butterflies (paperback edn): i-xxvi, 1-429.— New Jersey: Princeton University Press. [Main text first published in 1984, as *Symposia of the Royal Entomological Society of London* (11).]

Vane-Wright, R.I., Ackery, P.R. & Smiles, R.L., 1977. The polymorphism, mimicry and hostplant relationships of *Hypolimnas* butterflies.— Biological Journal of the Linnean Society 9: 285-297.

Vane-Wright, R.I., Boppré, M. & Ackery, P.R., 2002. *Miriamica*, a new genus of milkweed butterflies with unique androconial organs (Lepidoptera: Nymphalidae).— Zoologischer Anzeiger: 241: 255-267.

Vane-Wright, R.I. & Fermon, H., 2003. Taxonomy and identification of *Lohora* Moore (Lepidoptera: Satyrinae), the Sulawesi bush-browns.— Invertebrate Systematics 17: 129-141.

Vane-Wright, R.I. & Peggie, D., 1994. The butterflies of Northern and Central Maluku: diversity, endemism, biogeography, and conservation priorities.— Tropical Biodiversity 2(1): 212-230.

Vane-Wright, R.I. & Smiles, R.L., 1975. The species of the genus *Zethera* Felder (Lepidoptera: Nymphalidae, Satyrinae).— Journal of Entomology (B) 44: 81-100.

Van Son, G., 1979. The Butterflies of Southern Africa, Part 4, Nymphalidae: Nymphalinae. Edited by Dr L. Vári.— Transvaal Museum Memoirs 22: 1-286.

Veenakumari, K., Mohanraj, P. & Sreekumar, P.V., 1998. Host plant utilization by butterfly larvae in the Andaman and Nicobar Islands (Indian Ocean).— Journal of Insect Conservation 1: 235-246.

Voris, H.K., 2000. Maps of Pleistocene sea levels in Southeast Asia: shorelines, river systems and time durations.— Journal of Biogeography 27: 1153-1167.

Wahlberg, N., Weingartner, E. & Nylin, S., in press. Towards a better understanding of the higher systematics of Nymphalidae (Lepidoptera: Papilionoidea).— Molecular Phylogenetics and Evolution.

Wallace, A.R., 1865. On the phenomena of variation and geographical distribution by the Papilionidae of the Malayan Region.— Transaction of the Linnean Society of London 25: 1-71, 8 pls.

Wallace, A.R., 1867. On the Pieridae of the Indian and Australian Regions.— Transactions of the Entomological Society of London 1867: 301-415, 4 pls.

Wallace, A.R., 1869. The Malay Archipelago, Vol. 1: i-xv, 1-478, Vol. 2: 1-524.— London.

Warren, B.C.S., 1944. Review of the classification of the Argynnidi, with a systematic revision of the genus *Boloria* (Lepidoptera; Nymphalidae).— Transactions of the Royal Entomological Society of London 94: 1-101, 46 pls.

Warren, B.C.S., 1955. A review of the classification of the subfamily Argynninae (Lepidoptera: Nymphalidae). Part 2. Definition of the Asiatic genera.— Transactions of the Royal Entomological Society of London 107: 381-392, 4 pls.

Waterhouse, D.F. & Norris, K.R., 1989. Biological control. Pacific prospects-supplement 1.— ACIAR Monograph (12): i-vii, 1-123.

Watson, G.W., Ooi, P.A.C. & Girling, D.J., 1995. Insects on plants in the Maldives and their management.— Ascot, UK.

Weller, S.J. & Pashley, D.P., 1995. In search of butterfly origins.— Molecular Phylogenetics and Evolution 4: 235-246.

Westwood, J.O., 1888. List of diurnal Lepidoptera collected in the Northern Celebes by Dr. Hickson.— Transactions of the Entomological Society of London 1888: 467-470.

Whalley, P.E.S., 1986. A review of the current fossil evidence of Lepidoptera in the Mesozoic.— Biological Journal of the Linnean Society 28: 253-271.

Whitmore, T.C. (ed.). 1981. Wallace's line and plate tectonics.— Oxford Monographs on Biogeography (1): i-xii, 1-91. Oxford.

Whitmore, T.C. (ed.), 1987. Biogeographical evolution of the Malay Archipelago.— Oxford Monographs on Biogeography (4): i-x, 1-147. Oxford.

Whitten, A.J., Mustafa, M. & Henderson, G.S., 1987. The ecology of Sulawesi: i-xxi, 1-779.— Yogyakarta, Indonesia.

Whitten, A.J., Mustafa, M. & Henderson, G.S., 2002. The ecology of Sulawesi [2nd edn.]. The Ecology of Indonesia Series 4: i-xxx , 1-754.— Jakarta.

Williams, P.H., 2001. Complementarity.— Encyclopedia of Biodiversity 1: 813-829. San Diego.

Williams, P.H. & Araújo, M.B. 2000. Using probabilities of persistence to identify important areas for biodiversity.— Proceedings of the Royal Society of London B 267: 1959-1966.

Williams, P.H., de Klerk, H.M. & Crowe, T.M., 1999. Interpreting biogeographical boundaries among afrotropical birds: spatial patterns in richness gradients and species replacement.— Journal of Biogeography 26: 459-474.

Wynter-Blyth, M. A., 1982. Butterflies of the Indian Region. Reprint edition: i-xx, 1-523.— New Delhi.

Yagishita, A, Nakano, S. & Morita, S., 1993. An illustrated list of the genus *Delias* Hübner of the world (ed. Y. Nishiyama) [in two volumes, text and colour plates].— Tokyo.

Yamauchi, T. & Yata, O., 2000. Systematics and biogeography of the genus *Gandaca* Moore (Lepidoptera: Pieridae).— Entomological Science 3: 331-343.

Yamauchi, T., Yata, O. & Peggie, D., in press. A new subspecies of *Delias benasu* from Mt Tambusisi, Northeastern Sulawesi.

Yata, O., 1981a. Pieridae. In: E. Tsukada (ed.). Butterflies of the South East Asian Islands 1: 33-120, 205-438.— Tokyo.

Yata, O., 1981b. Two new species and two new subspecies of pierid butterflies from Indonesia and the Philippines.— Memoirs of the Tsukada Collection, Japan (3): 23-27, 2 pls.

Yata, O., 1988. A revision of the Old World species of the genus *Eurema* Hübner (Lepidoptera, Pieridae).— PhD thesis, Fukuoka, Japan.

Yata, O., 1989. A revision of the Old World species of the genus *Eurema* Hübner (Lepidoptera, Pieridae). Part I. Phylogeny and zoogeography of the subgenus *Terias* Swainson and description of the subgenus *Eurema* Hübner.— Bulletin of the Kitakyushu Museum of Natural History 9: 1-103.

Yata, O., 1991. A revision of the Old World species of the genus *Eurema* (Lepidoptera, Pieridae). Part II. Description of the *smilax*, the *hapale*, the *ada* and the *sari* (part) groups.— Bulletin of the Kitak-

yushu Museum of Natural History 10: 1-51.
Yata, O., 1992. A revision of the Old World species of the genus *Eurema* (Lepidoptera, Pieridae). Part III. Description of the *sari* group (part).— Bulletin of the Kitakyushu Museum of Natural History 11: 1-77.
Yata, O., 1994. A revision of the Old World species of the genus *Eurema* (Lepidoptera, Pieridae). Part IV. Description of the *hecabe* group (part).— Bulletin of the Kitakyushu Museum of Natural History 13: 59-105.
Yata, O., 1995. A revision of the Old World species of the genus *Eurema* (Lepidoptera, Pieridae). Part V. Description of the *hecabe* group (part).— Bulletin of the Kitakyushu Museum of Natural History 14: 1-54.
Yata, O., Chainey, J.E. & Vane-Wright, R.I. in prep. The species of *Appias* subgenus *Catophaga* and their coloration (Lepidoptera: Pieridae).— To be submitted to *Systematic Entomology*.
Yokochi, T. 1996. New male record of *Euthalia amanda* (Hewitson) from Selayar Is., Indonesia (Lepidoptera, Nymphalidae).— Futao 21: 1, pl. 1.
Yokochi, T. 1999a. Type series of the tribe Euthalini (Rhopalocera, Nymphalidae) in Zoologisches Museum, Humboldt Universität (ZMHU), Berlin, with designations of lectotypes and some notes.— Transactions of the Lepidopterological Society of Japan 50: 173-192.
Yokochi, T. 1999b. A revision of the *lubentina* group of genus *Euthalia* (Rhopalocera, Nymphalidae) in the Indo-Australian region (1).— Butterflies, Japan 22: 33-51.
Yokochi, T., 1999c. A revision of the *lubentina* group of genus *Euthalia* (Rhopalocera, Nymphalidae) in the Indo-Australian Region (II).— Butterflies, Japan 23: 20-35.
Yokochi, T. 1999d. A revision of the *lubentina* group of genus *Euthalia* (Rhopalocera, Nymphalidae) in the Indo-Australian region (III).— Butterflies, Japan 24: 25-36.
Yoshimoto, H. 2001. Generic treatment of the tortoiseshell and its allied jagged nymphalids (Lepidoptera, Nymphalidae, Nymphalinae).— Butterflies, Japan 28: 40-46.
Young, J.J. 1998. A brief note on the life history of *Remelana jangala* (Horsfield) Lepidoptera, Lycaenidae in Hong Kong, PRC.— Futao 28: 11-16.

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