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Birds and mammals of the Bukit Barisan Selatan National Park, Sumatra, Indonesia

Timothy G. O'Brien and Margaret F. Kinnaird

Bukit Barisan Selatan National Park in south-west Sumatra is one of the largest protected areas in Sumatra and thus of considerable importance to the conservation of biodiversity in Indonesia. Until recently, little was known of the wildlife in the park. The authors' surveys document the presence of an intact community of the birds and mammals known to occur in lowland Sumatran rain forests. While hunting and collection of forest products threaten a number of plant and animal species in the park, the primary threat to the park's integrity is from agricultural encroachment and expansion of enclaves beyond their boundaries. The future survival of Bukit Barisan National Park and its wildlife requires that active measures be taken to curb non-sustainable exploitation of plants and wildlife. It will also be necessary to resolve land-use conflicts with communities in, and adjacent to, the park.

Introduction

Bukit Barisan Selatan National Park (BBSNP) is the third largest protected area (3568 sq km) on the Indonesian island of Sumatra. Located in the extreme south-west of Sumatra (104°E, 50°S), the park spans two provinces, Lampung and Bengkulu, extending from the southern tip at Tanjung Cina to more than 120 km north along the Barisan Mountain Range (Figure 1). The BBSNP contains some of the largest intact tracts of lowland rain forest remaining in Sumatra and serves as the primary watershed for south-west Sumatra (FAO, 1981). Most of the Park (82 per cent) lies in Lampung Province, the most densely populated, poorest province of Sumatra, and one undergoing the most rapid forest conversion (Whitten *et al.*, 1987). The park's long, thin shape results in c. 700 km of boundaries, and encroachment by illegal logging and cultivation are recurrent problems.

Despite its large size and importance, BBSNP has not been surveyed systematically for mammals or birds; however, it is believed to be an important refuge for a major portion of Sumatra's mammal and bird fauna (FAO, 1981). Early reports indicate the pres-

ence of Sumatran rhinoceros*, Asian elephant, tiger, clouded leopard, Malayan sun bear, serow and Indian wild dog (FAO, 1981). Surveys for Sumatran rhinoceros in 1990 in a small area of the southern peninsula indicated 13–18 animals (AsRSG, 1995). If accurate, BBSNP may contain a substantial number of the estimated 200–300 Sumatran rhinos believed to remain in Indonesia. MacKinnon and Phillips (1993) reported that 121 bird species have been recorded in BBSNP, but suggest that the low figure is due to a lack of surveys in the area. The primary objectives of this survey were to develop baseline data on the presence and diversity of birds and mammals in protected lowland forest habitats of BBSNP.

Methods

We conducted surveys in BBSNP between 7 and 24 March 1995, at the end of the rainy season. We surveyed areas on foot between Tampang and Tanjung Belimbing (25 km), T. Belimbing to the Paya River (20 km), T.

* Scientific names of animals mentioned in the text are given in Table 1, and Appendices 1 and 2.

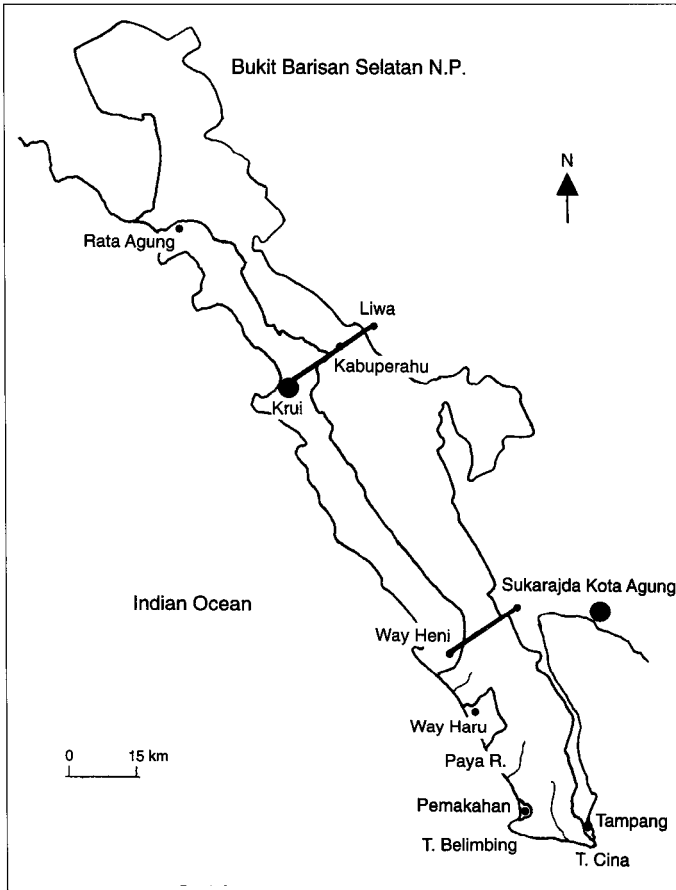


Figure 1. Map of Bukit Barisan Selatan showing villages, rivers and survey routes referred to in text.

Belimbing to T. Cina (32 km), Way Heni to Way Haru (40 km), and forests north of Rata Agung (15 km) (Figure 1). Surveys were conducted along established forest trails or elephant trails, and normally followed rivers or traversed areas between rivers. At each site, we recorded birds and mammals seen as well as indirect evidence (tracks, faeces, rooting). Indirect evidence is often the only indication that secretive forest mammals are present (Schemnitz, 1980; Rabinowitz, 1993). We also interviewed forest guards, hunters and collectors of forest products for information on tiger, clouded leopard, elephant and Sumatran rhinoceros. Finally, we surveyed literature for examples of faunal inventories in the region that might not have wide circulation.

Results

We verified the presence of 22 medium-sized to large mammals in areas surveyed (Table 1). Eleven mammals were recorded at most survey sites and the remaining 11 species were recorded at one or two survey sites. An additional 33 species have been reported from adjacent forests and agroforestry lands (Sibuea and Herdimansyah, 1993; Appendix 1)

Sumatran rhinoceros

We encountered recent rhino signs at three locations along the survey transects. In the vicinity of the Blambangan River we found footprints of at least two individuals, as well as scrapes and wallows. This area is a mosaic of open marshy areas, swamp forest and low-

land forest on low ridges. Another set of prints was found at Tanjung Belimbing, adjacent to a proposed hunting concession on the park's eastern border. At the Paya River we found one set of prints that were less than 24 hours old; our guide said prints in three size classes are normally found in this area. No signs of rhino were found north of Paya River, although rhino tracks were found in damar *Shorea javanica* gardens near Krui in 1993 (Sibuea and Herdimansyah, 1993). Interviewees in Rata Agung said there had been no reports of rhino in the area for many years.

Asian elephant

Fresh elephant signs were encountered on every trail and elephants were seen and heard on several occasions. More elephant signs were encountered in the southern peninsula. Prints and faeces of young animals were seen on three surveys. Evidence was usually of lone individuals or groups of two or three animals. Based on interviews, we estimate approximately 100–150 elephants in the park.

Cats

We found no tracks of tigers or clouded leopards during our survey. On two transects we found tracks of small, unidentified forest cats. There are periodic reports of tigers killing dogs and goats in the Belimbing and Way Heni areas, and tracks of tiger and clouded leopard have been reported in damar gardens near Krui on the edge of the park.

Primates

Siamang were abundant in all areas surveyed and family groups ranged from three to seven individuals. Less common were dark-handed gibbons, which we encountered only in the Paya River, Cangkuk River and Rata Agung areas. Lack of gibbons in the southern peninsula may reflect their need for continuous canopy forest. Small groups of banded langurs and silvered langurs were present in every site surveyed. Long-tailed macaques were most common in the southern peninsula. Pig-tailed macaques and the western tarsier were not

Common name	Scientific name	Method of identification
Flying fox	<i>Pteropus vampyrus</i>	Photographs
Long-tailed macaque	<i>Macaca fascicularis</i>	Visual/vocalization
Silvered langur	<i>Presbytis cristata</i>	Visual/vocalization
Banded langur	<i>Presbytis melalophus</i>	Visual/vocalization
Dark-handed gibbon	<i>Hylobates agilis</i>	Visual/vocalization
Siamang	<i>Hylobates syndactylus</i>	Visual/vocalization
Malayan sun bear	<i>Helarctos malayanus</i>	Visual/tree damage
Hairy-nosed otter	<i>Lutra sumatrana</i>	Visual/tracks
Tiger	<i>Panthera tigris</i>	Local report
Clouded leopard	<i>Neofelis nebulosa</i>	Local report
Unidentified small cat	<i>Felis sp.</i>	Tracks
Asian elephant	<i>Elephas maximus</i>	Visual/faeces/tracks
Malayan tapir	<i>Tapirus indicus</i>	Tracks
Sumatran rhinoceros	<i>Dicerorhinus sumatrensis</i>	Tracks
Wild pig	<i>Sus scrofa</i>	Visual/tracks
Lesser mouse deer	<i>Tragulus javanicus</i>	Visual/tracks
Red muntjac	<i>Muntiacus muntjak</i>	Tracks
Sambar deer	<i>Cervus unicolor</i>	Tracks/vocalization
Domestic water buffalo	<i>Bubalus bubalis</i>	Visual/faeces/tracks
Malayan giant squirrel	<i>Ratufa bicolor</i>	Visual/vocalization
Plantain squirrel	<i>Callosciurus notatus</i>	Visual
Common porcupine	<i>Hystrix brachura</i>	Quills

Table 1. Mammal species identified in Bukit Barisan Selatan National Park

observed or heard, but both species have been reported in BBSNP and southern Sumatra (Payne *et al.*, 1985; Whitten *et al.*, 1987).

Other mammals

Tracks of sambar deer, red muntjac (barking deer) and mouse deer were found regularly on all surveys, and deer were observed on several occasions. In the north deer are hunted regularly but in the south no one admitted to hunting, possibly because we travelled with park guards. Wild pig *Sus scrofa* tracks and signs of rooting were also abundant at all sites. Domestic water buffalo were common from T. Belimbing to the Blambangan River. We found tracks of three or more Malayan tapir only in the Tampang–T. Belimbing area. Otter tracks were found at T. Belimbing and eight hairy-nosed otters, including one albino, were observed near Way Haru. We encountered Malayan sun bears only between Way Heni and Way Haru and north of Rata Agung, although we received reports of their presence at all survey sites. We did not encounter signs of Indian wild dog, although it was believed common in BBSNP during the late 1970s. We also saw no evidence of civets, weasels, martens or badgers along the survey routes.

Hornbills and other birds

We confirmed the presence of seven species of hornbills in BBSNP. All sites contained at least five species. Most common were the helmeted, oriental pied, great and rhinoceros hornbills. Other surveys (Appendix 2) include two more species (white-crowned hornbill and wrinkled hornbill) making a total of nine species for the park. We located one active nest of the wreathed hornbill near the Paya River.

Our surveys contributed 58 new species to the list of known occurrences in BBSNP. The total bird list for BBSNP is 276 species out of 397 species believed to occur in Sumatra (Appendix 2). Most of the additions were forest interior birds. The diversity of lowland habitats (forest, swamp, coastal, marsh) provides habitat for a rich avian community in the park and we found relatively high diver-

sity at all sites surveyed. Notably lacking from this list are nocturnal birds and montane species, which probably occur in the park.

Human activity in the park

Because of BBSNP's long border, patrolling is difficult and access to the park is relatively easy. Along the boundary near Tampang we encountered pit-sawing activity and most of the large dipterocarp trees were gone. Rattan was conspicuously absent at all sites surveyed and we encountered collectors of rattan and gaharu (fragrant resin from heartwood of *Aquilaria* spp.) in the forest near Rata Agung. There was evidence of expansion of agricultural lands across park boundaries at the enclave of Pemakahan and reports of illegal land clearance near the Kabuperahu enclave. We observed agricultural encroachment at Rata Agung and heard reports of similar problems near Krui. Residents of the enclave at Way Haru recently attempted to cut a road through the park but were stopped halfway by the Ministry of Forestry. On a larger scale, the construction of paved roads by the provincial government has been accompanied by extensive logging and resulted in the division of the park into three parts.

Human–wildlife interactions in BBSNP vary. Because there is no buffer zone, agricultural lands are immediately adjacent to, or inside the park. Livestock predation by tigers and clouded leopards occurs occasionally. Elephant depredation to rice paddies and coffee gardens is among the most pressing problems. This problem receives a great deal of publicity and there is pressure to institute culling and capture programmes to control elephants that move out of reserves (Jakarta Post, 1994; Pak Panjaitan, PHPA, pers. comm.). Hunting for local consumption occurs (especially deer species and great argus pheasant) but we heard of no instances of elephant or rhino poaching.

There is widespread local trade in edible swiftlet nests from the area. The Ministry of Forestry has issued collecting permits for sustainable exploitation at two sites, but most caves in the region are not owned and nests

are freely collected and sold. Capturing wild birds for local bird trade is also common; one guide admitted to collecting hornbill chicks for sale.

Discussion

We consider the wildlife communities of lowland forests in BBSNP to be representative of intact lowland tropical rain forest. Surveys carried out in forests and damar gardens adjacent to the park indicate the presence of at least 52 forest mammal species, including Sumatran rhino, tiger and clouded leopard (Sibuea and Herdimansyah, 1993). We presume these species also occur within the park. The bird community is quite diverse, with approximately 70 per cent of Sumatra's avifauna occurring in the park's lowland forests.

The indigenous mammalian herbivore community in BBSNP is represented by Sumatran rhinoceros, Malayan tapir, Asian elephant, serow, wild pig and several deer species. The Sumatran rhinoceros may be more widespread than previously believed, but appears to be absent from the Rata Agung area. The BBSNP rhino population may be one of the most important remaining populations of this seriously endangered species. The elephant population appears to be healthy; it is widespread and breeding, and poaching is probably not a serious problem at this time. Although we lack population information for other herbivores, the survey indicates the continued survival of these species in the park.

Our surveys failed to find much evidence of mammalian carnivores in the primary forests of BBSNP, although we know that at least nine species occur in and around the park. One problem with a generalized survey of this nature is that most carnivore species are nocturnal and our surveys were diurnal. Civets may have been underrepresented because we did not sample secondary forest and edge habitats. Overall, however, the lack of signs (e.g. footprints, scrapes, faeces) indicates low densities for most carnivore species. It is possible that Indian wild dog, tiger and cloud leopard have been hunted heavily in the lowland

forests or that densities have always been low in this region. More intensive surveys are needed to resolve the status of mammalian carnivores.

Bird diversity is high in the forests of BBSNP, and is comparable to the island of Java. Thiollay (1995) recorded more than 150 species during a short, but intensive survey of avian diversity in forests north of Rata Agung. BBSNP has avian diversity similar to well-studied lowland sites in Borneo (MacKinnon and Phillipps, 1993), such as Danum Valley Conservation Area, Sabah, Malaysia (240 species), Kutai National Park, East Kalimantan, Indonesia (236 species) and Barito Ulu Research Area, Central Kalimantan, Indonesia (230 species). In Sumatra, only Gunung Leuser National Park exceeds the richness of BBSNP (>325 species; Griffiths, 1994). Avian diversity in BBSNP may be comparable to Gunung Leuser NP once the nocturnal and montane birds are sampled.

Presence/absence data are useful for assessing the potential of an area for biodiversity conservation. They do not, however, reveal information concerning the population status of birds and mammals in these parks. Populations of exploited species, such as the tiger and Sumatran rhinoceros, may be present but under severe pressure and, possibly, facing local extinction. Populations of straw-headed bulbuls and white-rumped shamas are almost certainly declining due to capture for the bird trade, but trend data are lacking.

Apart from large-scale destruction of forests during the 1970s and 1980s, the interior forests of BBSNP appeared to be in very good shape. Pit-sawing and collecting local forest products are having impacts on certain species (e.g. trees of Dipterocarpaceae, rattan) along the borders. Encroachment will continue to be a problem around the park until issues of population growth and migration into the area are addressed. Currently, the Ministry of Forestry has neither the manpower, enforcement capability nor the training to address these land-use conflicts (USAID, 1994). Park headquarters are more than 20 km from the park and park guards do not live near the sites they are assigned to patrol. Most of the collectors and

farmers we talked to believed that it was their right to use or cut forest as the need arose. Reconciliation of local needs with conservation is urgently needed in the area.

Protection and management activities should focus on illegal encroachment, non-sustainable exploitation of wildlife and forest products, and implementation of land-use zoning. Constructive relationships between park staff and local communities should be initiated, such that local communities develop an appreciation and support for the conservation of BBSNP. Because the Ministry of Forestry lacks the finances and expertise to implement most of these recommendations, they might concentrate their resources on patrolling and securing the park boundaries. Meanwhile, international assistance is necessary to develop monitoring capabilities, park management, staff training and community education programmes. Such an approach is imperative if Bukit Barisan Selatan National Park is to retain its splendour as a repository of biodiversity in Indonesia.

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Appendix 1. Mammals known to occur in forests and agroforests adjacent to Bukit Barisan Selatan National Park

Family/species	English name	Family/species	English name
Tupaiaidae		<i>Ratufa bicolor</i>	Malayan giant squirrel
<i>Tupaia glis</i>	Common treeshrew	<i>Ratufa affinis</i>	Giant squirrel
<i>Ptilocercus lowii</i>	Pentail treeshrew	<i>Sundasciurus hippurus</i>	Horse-tailed squirrel
Cynocephalidae		<i>Sundasciurus lowii</i>	Low's squirrel
<i>Cynocephalus variegatus</i>	Flying lemur	<i>Tamias macclandii</i>	Himalayan striped squirrel
Pteropodidae		Muridae	
<i>Pteropus vampyrus</i>	Large flying fox	<i>Chiropodomys gliroides</i>	Common pencil-tailed tree-mouse
<i>Chironax melanocephalus</i>	Black-capped fruit bat	<i>Rattus exulans</i>	Polynesian rat
Rhinolophidae		<i>Rattus rattus</i>	House rat
<i>Rhinolophus luctus</i>	Great woolly horseshoe bat	<i>Rattus tiomanicus</i>	Malaysian field rat
Hipposideridae		Hystricidae	
<i>Hipposideros galeritus</i>	Cantor's roundleaf bat	<i>Antherurus macrourus</i>	Brush-tailed porcupine
Megadermatidae		<i>Hystrix brachyura</i>	Common porcupine
<i>Megaderma spasma</i>	Lesser false vampire bat	Ursidae	
Vespertilionidae		<i>Helarctos malayanus</i>	Malayan sun bear
<i>Pipistrellus stenopterus</i>	Narrow-winged pipistrelle	Mustelidae	
<i>Phoniscus atrox</i>	Gilded groove-toothed bat	<i>Lutra perspicillata</i>	Smooth otter
<i>Philetor brachypterus</i>	Narrow-winged brown bat	<i>Mydaus javanensis</i>	Malay badger
Molossidae		Viverridae	
<i>Cheiromeles torquatus</i>	Naked bat	<i>Arctogalidia trivirgata</i>	Small-tooth palm civet
Lorisidae		Felidae	
<i>Nycticebus coucang</i>	Slow loris	<i>Felis bengalensis</i>	Leopard cat
Tarsiidae		<i>Neofelis nebulosa</i>	Clouded leopard
<i>Tarsius bancanus</i>	Western tarsier	<i>Panthera tigris</i>	Tiger
Cercopithecidae		Elephantidae	
<i>Macaca fascicularis</i>	Long-tailed macaque	<i>Elephas maximus</i>	Indian elephant
<i>Macaca nemestrina</i>	Pig-tailed macaque	Tapiridae	
<i>Presbytis melalophus</i>	Banded leaf monkey	<i>Tapirus indicus</i>	Malayan tapir
<i>Presbytis cristata</i>	Silvered leaf monkey	Rhinocerotidae	
Hylobatidae		<i>Dicerorhinus sumatrensis</i>	Sumatran rhinoceros
<i>Hylobates agilis</i>	Black-handed gibbon	Suidae	
<i>Symphalangus syndactylus</i>	Siamang	<i>Sus scrofa</i>	Wild pig
Pholidota		Tragulidae	
<i>Manis javanica</i>	Pangolin	<i>Tragulus javanicus</i>	Lesser mouse deer
Sciuridae		<i>Tragulus napu</i>	Greater mouse deer
<i>Aeromys tephromelas</i>	Black flying squirrel	Cervidae	
<i>Petaurista petaurista</i>	Red giant flying squirrel	<i>Muntiacus muntjak</i>	Red muntjac
<i>Callosciurus nigrovittatus</i>	Black-striped squirrel	<i>Cervus unicolor</i>	Sambar deer
<i>Callosciurus notatus</i>	Plantain squirrel		
<i>Lariscus insignis</i>	Three-striped ground squirrel		

Data from Sibuea and Herdimansyah (1993); nomenclature follows Payne *et al.* (1985).

Appendix 2. Preliminary bird list for Bukit Barisan Selatan National Park

Family/species	English name	Family/species	English name
Pelicanidae		<i>Calidris ferruginea</i>	Curlew sandpiper
<i>Pelicanus conspicillatus</i>	Australian white pelican	<i>Calidris alba</i>	Sanderling
Fregatidae		<i>Tringa hypoleucos</i>	Common sandpiper
<i>Fregata ariel</i>	Lesser frigatebird	<i>Philomachus pugnax</i>	Ruff
<i>Fregata andrewi</i>	Christmas frigatebird	Burhinidae	
Ardeidae		<i>Esacus magnirostris</i>	Great thick-knee
<i>Ardea purpurea</i>	Purple heron	Laridae	
<i>Butorides striatus</i>	Striated heron	<i>Chlidonias hybrida</i>	Whiskered tern
<i>Egretta sacra</i>	Pacific reef egret	<i>Sterna hirundo</i>	Common tern
<i>Egretta intermedia</i>	Plumed egret	<i>Sterna albifrons</i>	Little tern
<i>Egretta garzetta</i>	Little egret	<i>Anous stolidus</i>	Brown noddy
Ciconiidae		Columbidae	
<i>Ibis cinereus</i>	Milky stork	<i>Treron vernans</i>	Pink-necked green-pigeon
<i>Aconia episcopus</i>	Woolly-necked stork	<i>Treron curvirostra</i>	Thick-billed green-pigeon
<i>Leptoptilus javanicus</i>	Lesser adjutant	<i>Treron capellei</i>	Large green pigeon
<i>Leptoptilus dubius</i>	Greater adjutant	<i>Ducula aenea</i>	Green imperial pigeon
Threskiornithidae		<i>Ducula bicolor</i>	Pied imperial pigeon
<i>Threskiornis melanocephalus</i>	Black-headed ibis	<i>Ducula badia</i>	Mountain imperial pigeon
Anatidae		<i>Macropygia ruficeps</i>	Little cuckoo-dove
<i>Dendrocygna arcuata</i>	Wandering whistling duck	<i>Streptopilia chinensis</i>	Spotted dove
Pandionidae		<i>Geopilia striata</i>	Zebra dove
<i>Pandion haliaetus</i>	Osprey	<i>Chalcophaps indica</i>	Emerald dove
Accipitridae		Psittacidae	
<i>Aviceda jerdoni</i>	Jerdon's baza	<i>Psittinus cyanurus</i>	Blue-rumped parrot
<i>Haliastur indus</i>	Brahminy kite	<i>Loriculus galgulus</i>	Blue-crowned hanging parrot
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	Cuculidae	
<i>Ichthyophaga ichthyaetus</i>	Grey-headed fish-eagle	<i>Cacomantis sonneratii</i>	Banded bay cuckoo
<i>Spilornis cheela</i>	Crested serpent-eagle	<i>Cacomantis merulinus</i>	Plaintive cuckoo
<i>Accipiter trivirgatus</i>	Crested goshawk	<i>Chrysococcyx xanthorhynchus</i>	Violet cuckoo
<i>Ictinactis malayensis</i>	Black eagle	<i>Surniculus lugubris</i>	Drongo cuckoo
<i>Hieraetus kiernii</i>	Rufous-bellied eagle	<i>Eudynamis scolopacea</i>	Asian koel
<i>Spizeatus cirrhatus</i>	Changeable hawk-eagle	<i>Phaenicophaeus diardi</i>	Black-bellied malkoha
<i>Spizeatus alboniger</i>	Blyth's hawk-eagle	<i>Phaenicophaeus curvirostris</i>	Chestnut-breasted malkoha
Falconidae		<i>Phaenicophaeus chlorophaeus</i>	Raffle's malkoha
<i>Microhierax fringillarius</i>	Black-thighed falconet	<i>Phaenicophaeus javanicus</i>	Red-billed malkoha
Phasianidae		<i>Phaenicophaeus sumatranus</i>	Chestnut-bellied malkoha
<i>Rollulus rouloul</i>	Crested partridge	<i>Phaenicophaeus tristis</i>	Green-billed malkoha
<i>Lophura ignita</i>	Crested fireback	<i>Centropus sinensis</i>	Greater coucal
<i>Gallus gallus</i>	Red junglefowl	<i>Centropus bengalensis</i>	Lesser coucal
<i>Argusianus argus</i>	Great argus	Caprimulgidae	
Rallidae		<i>Eurpstopodus temminckii</i>	Malaysian eared nightjar
<i>Porzana cinerea</i>	White-browed crake	Apodidae	
Scolopacidae		<i>Collocalia fuciphage</i>	Edible-nest swiftlet
<i>Numenius phaeopus</i>	Whimbrel	<i>Collocalia maxima</i>	Black-nest swiftlet
<i>Numenius arquata</i>	Eurasian curlew		
<i>Actitis hypoleucos</i>	Common sandpiper		
<i>Arenaria interpres</i>	Ruddy turnstone		

Appendix 2. (continued)

Family/species	English name	Family/species	English name
<i>Collocalia esculenta</i>	White-bellied swiftlet	Capitonidae	
<i>Hirundapas cochinchinensis</i>	White-vented needle-tail	<i>Megalaima chrysopogon</i>	Gold-whiskered barbet
<i>Apus pacificus</i>	Fork-tailed swift	<i>Megalaima rafflesii</i>	Red-crowned barbet
<i>Apus affinis</i>	Little swift	<i>Megalaima mystacophanus</i>	Red-throated barbet
Hemiprocneidae		<i>Megalaima ortii</i>	Black-browed barbet
<i>Hemiprocne longipennis</i>	Grey-rumped treeswift	<i>Megalaima henrici</i>	Yellow-crowned barbet
<i>Hemiprocne comata</i>	Whiskered treeswift	<i>Megalaima australis</i>	Blue-eared barbet
Trogonidae		<i>Megalaima haemacephala</i>	Coppersmith barbet
<i>Harpactes duvaucelii</i>	Scarlet-rumped trogon	<i>Calorhamphus fuliginosus</i>	Brown barbet
<i>Harpactes kasumba</i>	Red-naped trogon	Indicatoridae	
<i>Harpactes diardii</i>	Diard's trogon	<i>Indicator archipelagicus</i>	Malaysian honeyguide
<i>Harpactes oreskios</i>	Orange-breasted trogon	Picidae	
<i>Harpactes erythrocephalus</i>	Red-headed trogon	<i>Sasia abnormis</i>	Rufous piculet
Alconidae		<i>Celex brachyurus</i>	Rufous woodpecker
<i>Alcedo atthis</i>	Common kingfisher	<i>Meiglyptes tristis</i>	Buff-rumped woodpecker
<i>Alcedo meninting</i>	Blue-eared kingfisher	<i>Meiglyptes tuckii</i>	Buff-necked woodpecker
<i>Ceyx rufidorsa</i>	Rufous-backed kingfisher	<i>Dryocopus javensis</i>	White-bellied woodpecker
<i>Ceyx erithacus</i>	Black-backed kingfisher	<i>Hemicircus concretus</i>	Grey and buff woodpecker
<i>Lacedo pulchella</i>	Banded kingfisher	<i>Blythipicus rubiginosus</i>	Maroon woodpecker
<i>Halcyon capensis</i>	Stork-billed kingfisher	<i>Picus mentalis</i>	Checker-throated woodpecker
<i>Halcyon smyrnensis</i>	White-throated kingfisher	<i>Picus flavinucha</i>	Geater yellow-nape
<i>Halcyon pileata</i>	Blacked-capped kingfisher	<i>Picus puniceus</i>	Crimson-winged woodpecker
<i>Todirhamphus chloris</i>	Collared kingfisher	<i>Picus miniaceus</i>	Banded woodpecker
<i>Actenoides concretus</i>	Rufous-collared kingfisher	<i>Dinopium javanense</i>	Common goldenback
Maropidae		<i>Dinopium rafflesii</i>	Olive-backed woodpecker
<i>Merops viridis</i>	Blue-throated bee- eater	<i>Mulleripicus pulverulentus</i>	Great slaty woodpecker
<i>Nyctyornis amictus</i>	Red-bearded bee- eater	<i>Reinwardtipicus validus</i>	Orange-backed woodpecker
<i>Eurystomus orientalis</i>	Dollarbird	Eurylaimidae	
Bucerotidae		<i>Corydon sumatranus</i>	Dusky broadbill
<i>Anorrhinus galeritus</i>	Bushy-crested hornbill	<i>Cymbirhynchus macrohynchus</i>	Black and red broadbill
<i>Berenicornis comatus</i>	White-crowned hornbill	<i>Eurylaimus javanicus</i>	Banded broadbill
<i>Rhyticeros undulatus</i>	Wreathed hornbill	<i>Eurylaimus ochromalus</i>	Black and yellow broadbill
<i>Rhyticeros corrogatus</i>	Wrinkled hornbill	<i>Serilophus lunatus</i>	Silver-breasted broadbill
<i>Anthracoceros malayanus</i>	Asian black hornbill	<i>Psarisomus dalhousie</i>	Long-tailed broadbill
<i>Anthracoceros albirostris</i>	Oriental pied hornbill	<i>Calypptomena viridis</i>	Green broadbill
<i>Buceros rhinoceros</i>	Rhinoceros hornbill		
<i>Buceros bicornis</i>	Great hornbill		
<i>Rhinoplex vigil</i>	Helmeted hornbill		

Appendix 2. (continued)

Family/species	English name	Family/species	English name
Pittidae		<i>Dicrurus paradiseus</i>	Greater racket-tailed drongo
<i>Pitta granatina</i>	Garnet pitta	Oriolidae	
<i>Pitta venusta</i>	Black-crowned pitta	<i>Oriolus chinensis</i>	Black-naped oriole
<i>Pitta sordida</i>	Hooded pitta	<i>Oriolus xanthonotus</i>	Dark-throated oriole
Hirundinidae		<i>Irena puella</i>	Asian fairy bluebird
<i>Hirundo rustica</i>	Barn swallow	Corvidae	
<i>Hirundo tahitica</i>	Pacific swallow	<i>Platylophus galericulatus</i>	Crested jay
Campephagidae		<i>Dendrocitta occipitalis</i>	Sumatran treepie
<i>Hemipus hirundinaceae</i>	Black-winged flycatcher-shrike	<i>Platysmurus leucopterus</i>	Black magpie
<i>Tephrodornis gularis</i>	Large woodshrike	<i>Corvus enca</i>	Slender-billed crow
<i>Coracina striata</i>	Bar-bellied cuckoo-shrike	<i>Corvus macrorhynchus</i>	Large-billed crow
<i>Coracina fimbriata</i>	Lesser cuckoo-shrike	Sittidae	
<i>Lalage nigra</i>	Pied triller	<i>Sitta frontalis</i>	Velvet-fronted nuthatch
<i>Pericrocotus flammeus</i>	Scarlet minivet	Timaliidae	
<i>Pericrocotus igneus</i>	Fiery minivet	<i>Pellorneum capistratum</i>	Black-capped babbler
<i>Pericrocotus cinnamomeus</i>	Small minivet	<i>Malacocincla malaccense</i>	Short-tailed babbler
Chloropseidae		<i>Malacocincla seiparium</i>	Horsfield's babbler
<i>Aegithina viridissima</i>	Green iora	<i>Trichastome bicolor</i>	Ferruginous babbler
<i>Aegithia thylia</i>	Common iora	<i>Malacopteron magnirostre</i>	Moustached babbler
<i>Chloropsis cyanopogon</i>	Lesser green leafbird	<i>Malacopteron affine</i>	Sooty-capped babbler
<i>Chloropsis cochinchinensis</i>	Blue-winged leafbird	<i>Malacopteron cinereum</i>	Scaly-crowned babbler
<i>Chloropsis sonnerati</i>	Greater green leafbird	<i>Malacopteron magnum</i>	Rufous-crowned babbler
<i>Chloropsis aurifrons</i>	Gold-fronted leafbird	<i>Pomatorhinus montanus</i>	Chestnut-backed scimitar-babbler
Pycnonotidae		<i>Napothera macrodactyla</i>	Large wren-babbler
<i>Pycnonotus zeylanicus</i>	Straw-headed bulbul	<i>Stachyris rufifrons</i>	Rufous-fronted babbler
<i>Pycnonotus atriceps</i>	Black-headed bulbul	<i>Stachyris nigriceps</i>	Grey-throated babbler
<i>Pycnonotus melanicterus</i>	Black-crested bulbul	<i>Stachyris striolata</i>	Spot-necked babbler
<i>Pycnonotus squamatus</i>	Scaly-breasted bulbul	<i>Stachyris poliocephala</i>	Grey-headed babbler
<i>Pycnonotus cyaniventris</i>	Grey-bellied bulbul	<i>Stachyris erythroptera</i>	Chestnut-winged babbler
<i>Pycnonotus aurigaster</i>	Sooty-headed bulbul	<i>Macronous gularis</i>	Striped tit-babbler
<i>Pycnonotus entilotus</i>	Puff-backed bulbul	<i>Macronous ptilosus</i>	Fluffy-backed tit-babbler
<i>Pycnonotus goiavier</i>	Yellow-vented bulbul	<i>Garulax leucolophus</i>	White-crested laughingthrush
<i>Pycnonotus brunneus</i>	Red-eyed bulbul	<i>Garulax lugrubs</i>	Black laughingthrush
<i>Pycnonotus simplex</i>	Cream-vented bulbul	<i>Leiothryx argentarius</i>	Silvered-ear mesia
<i>Pycnonotus erythroptalmos</i>	Spectacled bulbul	<i>Pteruthius flaviscapis</i>	White-browed shrike-babbler
<i>Alophoixus ochraceus</i>	Ochraceous bulbul	<i>Alcippe brunneicauda</i>	Brown fulvetta
<i>Alophoixus phaeocephalus</i>	Yellow-bellied bulbul	<i>Heterophasia picaoides</i>	Long-tailed sibia
<i>Alophoixus bres</i>	Grey-cheeked bulbul	<i>Eupetes macrocerus</i>	Rail babbler
<i>Ixos malaccensis</i>	Streaked bulbul	Turdidae	
<i>Hypsipetes flavala</i>	Ashy bulbul	<i>Coprychus saularis</i>	Magpie robin
<i>Iole olivacea</i>	Buff-vented bulbul	<i>Coprychus malabaricus</i>	White-rumped shama
<i>Tricholestes criniger</i>	Hairy-backed bulbul	<i>Copsyclus pyrrhopygus</i>	Rufous-tailed shama
Dicruridae			
<i>Dicrurus leucophaeus</i>	Ashy drongo		
<i>Dicrurus hottentatus</i>	Hair-crested drongo		
<i>Dicrurus sumatranus</i>	Sumatran drongo		
<i>Dicrurus aeneus</i>	Bronzed drongo		
<i>Dicrurus remifer</i>	Lesser racket-tailed drongo		

Appendix 2. (continued)

Family/species	English name	Family/species	English name
<i>Enicurus ruficapillus</i>	Chestnut-naped forktail	<i>Anthus novaeseelandiae</i>	Common pipit
<i>Enicurus leschenaulti</i>	White-crowned forktail	Laniidae	
<i>Myiophonus glaucinus</i>	Sunda whistling- thrush	<i>Lanius tigrinus</i>	Tiger shrike
<i>Myiophonus caeruleus</i>		Sturnidae	
Sylviidae		<i>Aplonis panayensis</i>	Philippine glossy English name
<i>Abroscopus superciliaris</i>	Yellow-bellied warbler		starling
<i>Phylloscopus coronatus</i>	Eastern crowned warbler	<i>Gracula religiosa</i>	Hill myna
<i>Orthotomus sutorius</i>	Common tailorbird	Nectariniidae	
<i>Orthotomus atrogularis</i>	Dark-necked tailorbird	<i>Anthreptes simplex</i>	Plain sunbird
<i>Orthotomus sericens</i>	Rufous-tailed tailorbird	<i>Anthreptes malacensis</i>	Brown-throated sunbird
<i>Prinia flaviventris</i>	Yellow-bellied prinia	<i>Anthreptes rhodolaena</i>	Red-throated sunbird
<i>Prinia familiaris</i>	Bar-winged prinia	<i>Anthreptes singalensis</i>	Ruby-cheeked sunbird
<i>Cisticola juncidis</i>	Zitting cisticola	<i>Hypogramma</i>	Purple-naped sunbird
Muscicapidae		<i>hypogrammicum</i>	
<i>Rhinomyias olivacea</i>	Fulvous-chested rhinomyias	<i>Nectarina jugularis</i>	Olive-backed sunbird
<i>Rhinomyias umbratilis</i>	Grey-chested rhinomyias	<i>Aethopyga siparaja</i>	Crimson sunbird
<i>Cyanoptila cyanomelana</i>	Blue-and-white flycatcher	<i>Aethopyga mysticalis</i>	Scarlet sunbird
<i>Cyornis rufigastra</i>	Mangrove blue flycatcher	<i>Arachnothera crassirostris</i>	Thick-billed spiderhunter
<i>Cyornis concreta</i>	Dark-blue flycatcher	<i>Arachnothera robusta</i>	Long-billed spiderhunter
<i>Cyornis unicolor</i>	Pale-blue flycatcher	<i>Arachnothera flavigaster</i>	Spectacled spiderhunter
<i>Cyornis turcosus</i>	Malaysian blue flycatcher	<i>Arachnothera chrysogenys</i>	Yellow-eared spiderhunter
<i>Rhipidura perlata</i>	Spotted fantail	<i>Arachnothera longirostra</i>	Little spiderhunter
<i>Terpsiphone paradisi</i>	Asian paradise flycatcher	Dicaeidae	
<i>Eumyias thalassina</i>	Verditer flycatcher	<i>Prionochilus maculatus</i>	Yellow-breasted flowerpecker
<i>Eumyias indigo</i>	Indigo flycatcher	<i>Prionochilus percussus</i>	Crimson-breasted flowerpecker
<i>Muscicapa dauurica</i>	Asian brown flycatcher	<i>Dicaeum cruentatum</i>	Scarlet-backed flowerpecker
<i>Ficedula dumetoria</i>	Rufous-chested flycatcher	<i>Dicaeum concolor</i>	Plain flowerpecker
<i>Niltava grandis</i>	Large niltava	<i>Dicaeum trignostigma</i>	Orange-bellied flowerpecker
<i>Hypothymus azurea</i>	Black-naped monarch	<i>Dicaeum chrysothorax</i>	Yellow-vented flowerpecker
<i>Ptilentoma pyrhopterum</i>	Rufous-winged philentoma	<i>Dicaeum ignipectus</i>	Fire-breasted flowerpecker
<i>Philentoma velatum</i>	Maroon-breasted philentoma	Zosteropidae	
Motacillidae		<i>Zosterops palpebrosus</i>	Oriental white-eye
<i>Motacilla cinerea</i>	Grey wagtail	Ploceidae	
<i>Motacilla flava</i>	Yellow wagtail	<i>Lonchura leucogastra</i>	White-bellied munia
		<i>Lonchura malacca</i>	Black-headed munia
		<i>Lonchura maja</i>	White-headed munia

Compiled from FAO (1981), Thiollay (1995) and this survey. Nomenclature follows Andrews (1992).