

BIODIVERSITY IN THE CATCHMENT OF HIYARE RESERVOIR

M.P. de Silva

Department of Botany, University of Ruhuna

Abstract

Data are presented on the site characteristics and land-use types, and on species of trees, shrubs, fishes, tetrapod reptiles, snakes, amphibians and birds. The endemism of the tree and shrub species is especially high, at 47.5 and 31.5%. The catchment is therefore important for the preservation of biodiversity, as well as for its contribution to the water supply of the town of Galle.

Introduction

Hiyare is a natural reservoir with an area of 22.22 ha, in Galle District, in the south-east of Sri Lanka (Fig.1). It is located at about 6°3'N, 80° 21'E, and 100 m above sea level. Galle District falls within the low-country wet zone, with a moderately high mean annual rainfall of more than 2500 mm. The district is in the agro-ecological region WL4 (determined primarily by rainfall and elevation). The 75% expectancy rainfall for this region is more than 1525 mm (i.e. this is the least amount of rainfall expected, 3 years out of 4). The area around the reservoir is characterized by red-yellow podzolic soils with soft or hard laterite and bog or semi-bog conditions. The land is flat or undulating, with occasional rolling hilly terrain.

The reservoir is an important source of pure drinking water for the people of Galle, capital of the Southern Province. The water supply system was commissioned in 1911. It provides 1.8×10^6 litres daily, which is a fifth of the requirements of the town, through a 15-km pipeline. The rest of the supply is taken from the River Gin. A well preserved lowland rain forest, the Hiyare Forest Reserve, with an area of about 250 ha, occupies part of the catchment, which also includes some scrub forests, grasslands and paddy fields (Fig. 2). The Mahadola, a tributary of the Gin, rises in the western part of the catchment. The preservation of this catchment is therefore very important. This study was under-taken to investigate its biodiversity, in order to provide some useful basic data.

Methodology

The flora was identified along a number of line transects across the catchment. A list of fauna was compiled from the observations of the survey team, supplemented by interviews with the forest officers and the local people. The land-use pattern was determined from aerial photographs.

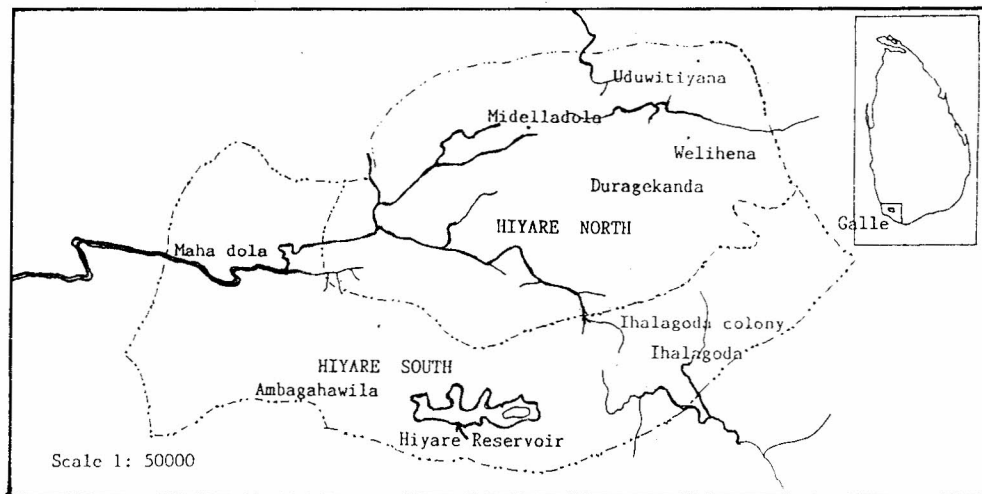


Figure 1: Location of the Hiyare Reservoir and the catchment in the Galle District

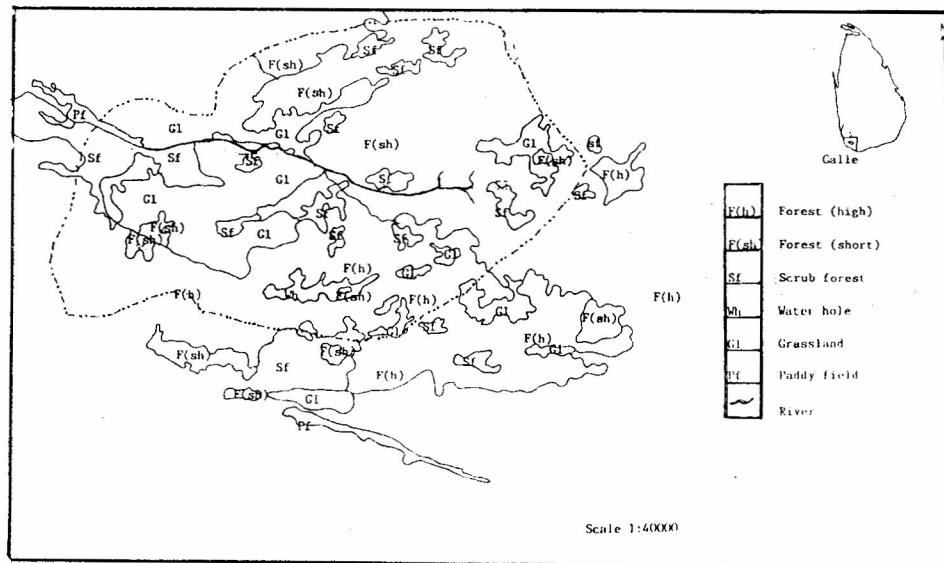


Figure 2: Landuse pattern in the Hiyare Forest Reserve

Results and discussion

Fig. 3 illustrates the average monthly rainfall during the present decade (data from Hiyare rain gauge). April to July (1020 mm) and September to November (790 mm) are the main rainy seasons, while generally dry conditions prevail during January to March and in August, although there is some rain throughout the year.

According to aerial photograph interpretations, the catchment comprised the following land-cover types, by percentages of the total land area:

Forests with taller trees (> 15 m)	19
Forests with shorter trees (< 15 m)	30
Shrub forest	14
Grassland	32
Water-fed areas	2
Paddy fields	3

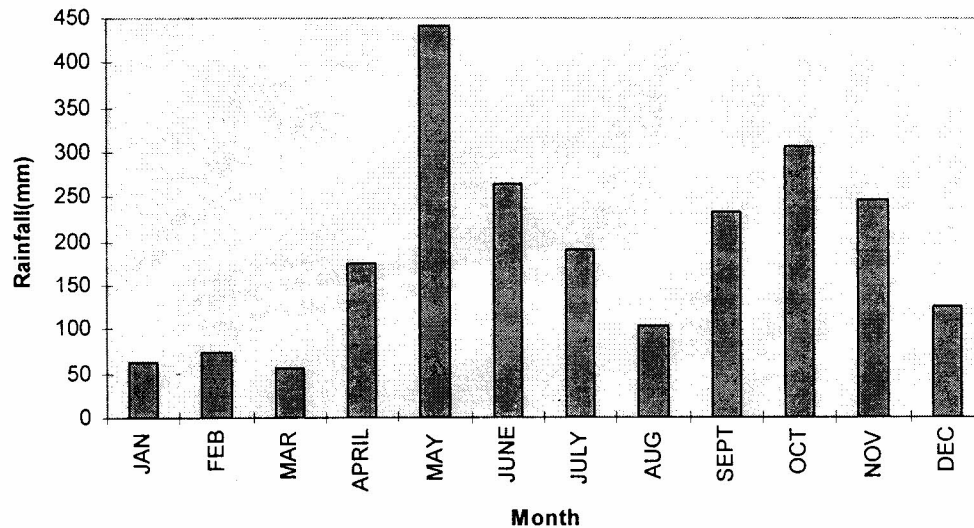


Figure 3 : Average rainfall at Hiyare (mm) 1990-96

The vegetation showed a very high percentage of endemism. Of the 40 tree and 19 shrub species identified, 19 (47.5%) and 6 (31.5%) were endemic, respectively.

In the appendices, endemics are marked with an asterisk. Appendices 1 and 2 list the trees and shrubs identified. Notable canopy trees include *Dipterocarpus glandulosus* (dorana), *D. hispidus* (bu-hora), *D. congestifolia*, *Canarium zeylanicum* (kekuna), *Chaetocarpus coriaceus* (hedawaka), *Kurrimia ceylanica* (uruhonda), *Calophyllum moonii* (domba kina), and *Palaquium grande* (kirihebbiliya) – these vernacular names, and the ones given below, are Sinhala.

Fig. 4 illustrates the distribution of flora and fauna within the catchment. The number of endemic species encountered within each group is also given. Appendices 3 to 7 list the fresh-water fishes, tetrapod reptiles, snakes, amphibians and birds that were identified. Notable among the fresh water fishes in the streams, especially in the Mahadola, are *Puntius nigrofasciatus* (bulath hapaya), *Rasbora vaterifloris* (halmaldandiya), and *Horadandia athukorali* (hora dandiya). Among the birds, *Galloperdrix bicalacarata* (lanka haban kukula) and *Ocyrceros gingalensis* (Sri Lankan gray hornbill) can still be seen in this environment.

From these data, Hiyare can be classified as an area of rich biodiversity. Its preservation is therefore of two-fold significance, first because of its biodiversity and second because of its water resources.

Acknowledgements

The author wishes to acknowledge the assistance of G.G. Gammachi (Forest Officer, Hiyare), R. Karunatilake of the Department of Botany, University of Ruhuna, and of Madura de Silva, A.K. Wijesekera and Janaka Gamachi of the Young Zoologist's Association of Galle.

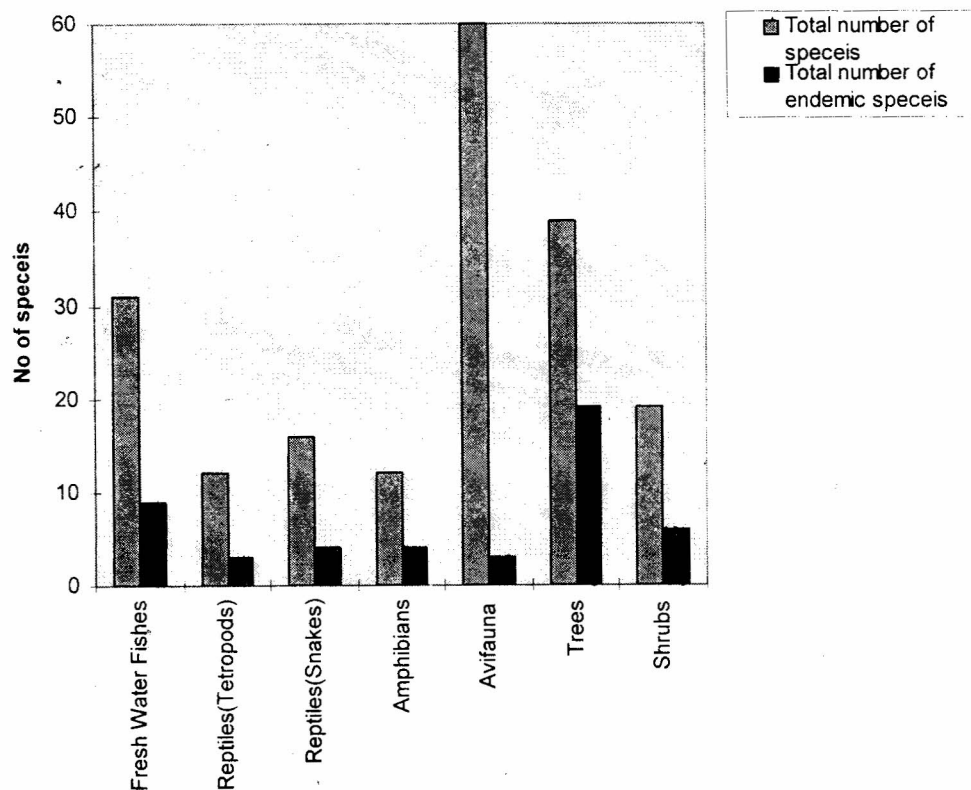


Figure 4 : Distribution of flora and fauna (total number of species and number of endemics identified)

Appendix 1 – Tree species

Rhizophoraceae	
<i>Anisophyllea cinnamomoides</i> *	welipenna
<i>Carallia brachiata</i>	dawata
Celastraceae	
<i>Kurrimia ceylanica</i> *	uruhonda
Myristicaceae	
<i>Horsfieldia iryaghedi</i> *	ruk
<i>Myristica dactyloides</i>	malaboda
Fabaceae	
<i>Pericopsis mooniana</i>	nadun
<i>Erythrina variegata</i>	erabadu
Sapindaceae	
<i>Filicium decipiens</i>	pehimbiya
Clusiaceae	
<i>Garcinia quaesita</i> *	ratagoraka
<i>Calophyllum moonii</i> *	domba kina
<i>Calophyllum cordato-oblongum</i> *	kalu kina
Menispermaceae	
<i>Cyclea burmanni</i>	kehipittan
Dipterocarpaceae	
<i>Dipterocarpus glandulosus</i> *	dorana
<i>Dipterocarpus hispidus</i> *	buhora
<i>Doona congestifolia</i> *	tiniya
Sapotaceae	
<i>Palaquium grande</i> *	kirihembiliya
Dilleniaceae	
<i>Dillenia retusa</i> *	godapara
<i>Wormia triquetra</i> *	diyapara
Moraceae	
<i>Artocarpus nobilis</i> *	bedi-del
Burseraceae	
<i>Canarium zeylanicum</i> *	kekuna
Lecythydaceae	
<i>Careya arborea</i>	kahata
Apocynaceae	
<i>Alstoria scholaris</i>	ruk-attana
<i>Alstonia macrophylla</i>	havari nuga
Myrtaceae	
<i>Syzygium caryophyllatum</i>	dan
<i>Syzygium rubicundum</i>	pinibaru
Palmae	
<i>Caryota urens</i>	kitul
<i>Calamus delicatulus</i> *	nara-wel
<i>Calamus rotong</i>	we-wel
Anacardiaceae	
<i>Mangifera zeylanica</i> *	etamba
<i>Lannea coromandelica</i>	hik
<i>Semecarpus gardneri</i> *	badulla

Verbenaceae	
<i>Vitex altissima</i>	milla
Euphorbiaceae	
<i>Bridelia retusa</i>	keta-kala
<i>Macaranga peltata</i>	kenda
<i>Aporosa cardiosperma</i> *	kampotta
<i>Chaetocarpus coriaceus</i> *	hedawaka
Cornaceae	
<i>Mastixia tetranda</i> var. <i>thwaitesii</i>	
Rubiaceae	
<i>Wendlandia bicuspadata</i>	
Menispermaceae	
<i>Cissampelos pareira</i>	diya-mitta

Appendix 2 - Shrubs

Melastomataceae	
<i>Osbeckia aspera</i>	bowitiya
<i>Osbeckia octandra</i>	heen-bowitiya
Hippocrataceae	
<i>Salacia reticulata</i>	himbutu-wel
Apocynaceae	
<i>Pagiantha dichotoma</i>	divi-kaduru
Araceae	
<i>Pothos scandens</i>	pota-wel
Thymelaeaceae	
<i>Gyneros walla</i>	patta-wala
Euphorbiaceae	
<i>Aporosa lindleyana</i>	kebella
Dilleniaceae	
<i>Tetracera sarmentosa</i>	korossa-wel
<i>Schumacheria castaneaefolia</i> *	kekiri-wel
Fabaceae	
<i>Entada pusaetha</i>	pus-wel
<i>Pongamia pinnata</i>	magul karanda
Flagellariaceae	
<i>Flagellaria indica</i>	goyi-wel
Lauraceae	
<i>Neolitsea cassia</i> *	dawul-kurunda
Rhamnaceae	
<i>Zyphus napeca</i> *	yak-eraminiya
Piperaceae	
<i>Piper sylvestre</i>	wal-gammiris wel
Liliaceae	
<i>Asparagus falcatus</i>	hatawariya
Ochnaceae	
<i>Ochna jabotapita</i> *	mal-kera
Bambusaceae	
<i>Ochlandra stridula</i> *	bota
Ancistrocladaceae	
<i>Ancistrocladus namatus</i> *	gona-wel

Appendix 3 – Fresh water fishes

(+ = introduced)

Anguilidae		
<i>Anguila bicolor</i>	level-finned eel	kalu aandha
Cyprinidae		
<i>Danio malabaricus</i>	giant danio	rath kailaya
<i>Esomus thermoicos</i>	flying barb	ravul dandia
<i>Horadandia athukorali*</i>	horadandia	hora dandia
<i>Puntius titeya*</i>	cherry barb	letiteya
<i>Puntius bimaculatus*</i>	red-side barb	ipilli kadaya
<i>Puntius dorsalis</i>	long-snouted barb	katu kureya
<i>Puntius filamentosus</i>	filamented barb	pethiya
<i>Puntius nigrofasciatus*</i>	black-ruby barb	bulath hapaya
<i>Puntius vittatus</i>	silver barb	podu pethiya
<i>Rasbora caverii</i>		
<i>Rasbora daniconius</i>	striped rasbora	dandiya
<i>Rasbora varifloris*</i>	golden rasbora	hal mal dandiya
Cobitidae		
<i>Lepidocephalichthys thermalis</i>	common spiny loach	chirava
Balitoridae		
<i>Schistura notostigma</i>	banded mountain loach	
Siluridae		
<i>Ompok bimaculatus</i>	butter catfish	walapoththa
Clariidae		
<i>Clarias brachysoma*</i>	walking catfish	
Heteropheustidae		
<i>Heteropheustes fossilis</i>	stinging catfish	hunga
Aplocheilidae		
<i>Aplocheilus weneri*</i>	Werner's killifish	iri handeya
Cichlidae		
<i>Etroplus suratensis</i>	pearl spot	koraliya
<i>Saratherodon mossambicus</i>	tilapia	tilapia
<i>Oreochromis niloticus*</i>	tilapia	tilapia
Gobiidae		
<i>Awaous grammepomus</i>	scribbled goby	weligouva
Anabantidae		
<i>Anabus testudineus</i>	climbing perch	kavaiya
Belontiidae		
<i>Belontia signata*</i>	combtail	thalkossa
Osphronemidae		
<i>Osphronemus gorami*</i>	giant gourami	seppali
Channidae		
<i>Channa gachua</i>	brown snakehead	parandal kanaya
<i>Channa marulius</i>	giant snakehead	ara
<i>Channa orientalis*</i>	smooth-breasted snakehead	kola kanaya
<i>Channa striata</i>	murrel	loola
Mastacembelidae		
<i>Mastacembelus armatus</i>	marbled spiny eel	gan theliya

Appendix 4 - Tetrapod reptiles

Emydidae		
<i>Melanochelys trijuga</i>	hard-shelled terrapin	gal ibba
Trionychidae		
<i>Lissemys punctata</i>	soft-shelled terrapin	kiri ibba
Gekkonidae		
<i>Cnemaspis tropidogaster</i>		
<i>Gehyra mutilata</i>	white house gecko	sudu geval huna
<i>Hemidactylus depressus</i>	jungle gecko	hali huna
<i>Hemidactylus frenatus</i>	house gecko	geval huna
Agamidae		
<i>Calotes calotes</i>	green garden lizard	pala katussa
<i>Calotes liolepis*</i>		
<i>Calotes versicolor</i>	common agamid lizard	gara katussa
<i>Ceratophora aspera*</i>	rough-nose horned lizard	gata ang-katussa
<i>Lyriocephalus scutatus*</i>	hum-nosed lizard	karamalbodilima
<i>Otocryptis wiegmanni*</i>	earless lizard	pinum katussa
Varanidae		
<i>Varanus bengalensis</i>	land monitor	thalagoya
<i>Varanus salvator</i>	water monitor	kabaragoya

Appendix 5 - Snakes

Uropeltidae		
<i>Cylindrophis maculatus*</i>	pipe snak	depath naya
Boidae		
<i>Python molurus</i>	python	pimbura
Colubridae		
<i>Elaphe helena</i>	trinket snake	kata kaluwa
<i>Lycodon aulicus</i>	common wolf snake	alu radanakaya
<i>Macropysthodon plumb color</i>	green keelback	wal gandiya
<i>Cercaspis curinatus*</i>	Sri Lankan wolf snake	dara karawala
<i>Oligodon toeniolatus</i>	variegated kukri snake	wairidathkatiya
<i>Boiga ceylonensis</i>	Sri Lanka cat snake	nidi mapila
<i>Dendrelaphis tristis</i>	Seba's bronze-back	tura haldanda
<i>Dendrelaphis bifrenalis</i>	Boulenger's bronze-back	panaduru-haldanda
<i>Ahaetulla nasutus</i>	green whip snake	ahatulla
<i>Xenochrophis asperrimus*</i>	Sri Lanka checkered diya keel-back	naya, polonga
Elapidae		
<i>Naja naja</i>	cobra	naya
Viperidae		
<i>Vipera russelli</i>	Russel's viper	tith polanga
<i>Hypnale hypnale*</i>	Merrem's hump-nosed vip	kunakatuwa
<i>Trimeresurus trigonocephalus*</i>	green pit viper	pala polanga

Appendix 6 – Amphibians

Bufo		
<i>Bufo atukorali</i> *	Atukorale's dwarf toad	atukoralage miti gamba
<i>Bufo Melonostictus</i>	common toad	goda gamba
Microhylidae		
<i>Kaloula pulchra</i>	red-banded kaloula	rathu vichithra gamba
Rhacophoridae		
<i>Philanstus variabilis</i>	variable bush frog	vichithra panduru gamba
<i>Polypedates eques</i> *	montane hourglass treefish	kandukara gas gamba
<i>Rhacophorus microtypanum</i> *	small-eared tree frog	kudukan ruk gamba
Ranidae		
<i>Rana aurantiaca</i>	lesser wood frog	kadawana madiya
<i>Rana corrugata</i> *	Sri Lanka corrugated frog	lanka ralli madiya
<i>Rana crassa</i>	kudu haile madiya	
<i>Rana cyanophlyctis</i>	water skipper	atikiththa
<i>Rana hexadactyla</i>	six-toed frog	kola madiya
<i>Rana limnocharis</i>	Indian reed frog	indiyanu pan madiya

Appendix 7 – Birds

(m = migrant; mr = migrant/resident)

GALLIFORMES

Phasianidae

<i>Galloperdix bicalcarata</i> *	Sri Lanka spurfowl	lanka haban
----------------------------------	--------------------	-------------

kukula

PICIFORMES

Picidae

<i>Dinopium ben-gholense</i>	red-backed woodpecker	
<i>Chrysocolaptes leuidus</i>	crimson-backed woodpecker	

Megalaimidae Captionidae

<i>Megalaimidae zeylanica</i>	brown-headed barbet	
<i>Megalaima rubricapilla</i>	Sri Lanka small barbet	

BUCEROTIFORMES

Bucerotidae

<i>Ocyrceros gingalensis</i> *	Sri Lanka gray hornbill	
--------------------------------	-------------------------	--

CORACIFORMES

Coraciidae

<i>Coracias bengalensis</i>	Indian roller	
-----------------------------	---------------	--

Alcedenidae

<i>Alcedo atthis</i>	common kingfisher	
<i>Alcedo meninting</i>	blue-eared kingfisher	

Dacelonidae

<i>Pelargopsis capensis</i>	stork-billed kingfisher	
<i>Halcyon smyrnensis</i>	white-breasted kingfisher	

Meropidae

<i>Merops philippinus</i>	blue-tailed bee-eater	
---------------------------	-----------------------	--

CUCULIFORMES

Cuculidae

<i>Cuculus canorus</i> ^m	common cuckoo
<i>Edynamys scolopacea</i>	koel
<i>Centropus sinensis</i>	common coucal

PSITTACIFORMES

Psittacidae

<i>Loriculus beryllinus</i> *	Sri Lankan lorikeet
<i>Psittacula krameri</i>	rose-ringed parakeet

APODIFORMES

Apodidae

<i>Cypsiurus balasinensis</i>	palm swift
-------------------------------	------------

STRIGIFORMES

Strigidae

<i>Ninox scutulata</i>	brown hawk owl
------------------------	----------------

COLUMBIFORMES

Columbidae

<i>Sreptopelia chinensis</i>	spotted dove
<i>Chalcophaps indica</i>	emerald doe
<i>Treorn pompadora</i>	Pompadour green pigeon
<i>Ducula aenea</i>	green imperial pigeon

GRUIFORMES

Rallidae

<i>Anaouornis phoenicurus</i>	white-breasted waterhen
-------------------------------	-------------------------

CICONIFORMES

Scolopacidae

<i>Gallinago stenura</i> ^m	pintail snipe
<i>Tringa hypoleucos</i> ^m	common sandpiper

Laridae

<i>Sternidae Sternidae</i>	
<i>Sterna albifrons</i>	little tern

Accipitridae

<i>Accipitrinae</i>	
<i>Haliastur indus</i>	brahmuni kite
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle
<i>Spilornis cheela</i>	crested serpent eagle
<i>Accipiter badius</i>	shikra

Halocrocoracidae

<i>Phalacrocorax niger</i>	little cormorant
----------------------------	------------------

Ardeidae

<i>Egretta garzetta</i>	little egret
<i>Mesophoyax intermedia</i>	median egret
<i>Ardeola grayii</i> Indian	pond heron
<i>Bubulcus ibis</i>	cattle egret

PASSERIFORMES

Irenidae

<i>Chloropsis cochinchinensis</i>	Jerdon's chloropsis
-----------------------------------	---------------------

Oriolidae/Campephagidae

<i>Oriolini chinensis</i> ^m	black-naped oriole
--	--------------------

<i>Pericrocotus cinnamomeus</i>	little minivet
<i>Pericrocotus flammeus</i>	orange minivet
Dierurini Dicruridae	
<i>Dierurus macrocerus</i>	black drongo
<i>Dierurus caerulescens</i>	white-vented drongo
Monarchini Monarchidae	
<i>Hypothymis azurea</i>	azure flycatcher
<i>Terpsiphone paradisi</i> ^{mf}	paradise flycatcher
Agithiniinae Chloropscidae	
<i>Aegithinia tiphia</i>	common iora
Muscicapidae	
Muscicapinae Muscicapidae	
(Muscicapini)	
<i>Muscicapa dauurica</i> ^m	brown flycatcher
<i>Cyornis trickelliae</i>	orange-breasted blue flycatcher
<i>Culicicapa ceylonensis</i>	gray-headed flycatcher
Saxicolini	
<i>Saxicoloides fulvicata</i>	black robin
Sturnidae	
<i>Gracula religiosa</i>	common grackle
Pycnonotidae	
<i>Pycnonotus cafer</i>	red-vented bulbul
<i>Hypsipetes leucocephalus</i>	black bulbul
Zosteropidae	
<i>Zosterops palpebrosa</i>	small white-eye
Sylviidae	
<i>Sylviinae</i>	
Timaliini Timaliidae	common babbler
Nectariniidae	
(Nectariniinae)	
Dicaeini Dicaeidae	
<i>Dicaeum erythrorhynchos</i>	small flower pecker
Nectariini	
<i>Nectarinia zeylonica</i>	purple-rumped sunbird
<i>Nectarinia asiatica</i>	purple sunbird
Passeridae	
Motacillinae Motacillidae	
<i>Anthus rutulus</i>	Indian pipit
Estrildinae Estrildidae	
<i>Lonchura striata</i>	white-backed munia
<i>Lonchura punctulata</i>	spotted munia