

Indian Lepidoptera

(Insects as Umbrella species)

Issue Number 2005.9

September 2005

*Flutter by
Butterfly
Floating flower
in the sky
Kiss me with your
Petal wings
Whisper secrets
Tell of spring*

■ Author Unknown

Welcome to the beautiful and colorful
World of Indian butterflies!!!!

Subscribe today to know more about
these lovely creatures.

Contents

Editorial by Kishen Das K R

The origin of butterflies in relation with the geological history of earth - when and where? By Ullasa Kondaramaiah

A Note on Atlas Moth (*Attacus atlas*) By Dr. Shubhalaxmi

A request from Bill Oehlke, Canada on Saturniidae Family

Butterflies of Melkote temple wildlife sanctuary, Karnataka by A Shiva Prakash

ButterflyIndia Meet – 2005 by Kishen Das K R

Editorial

Dear All,

During our younger days, most of us savored the idea of catching butterflies, tying beetles and dragonflies to a string and controlling their flight, poking spiders with twigs, putting sugar near ant nest and watching them while they dutifully carried the sugar, but all this came to a screeching halt as we got older. Our lives and our needs shifted gears. Inevitably, our inquisitive instincts give in to the harsher realities of life. We lost our innocence and appetite for enjoying those simple things. Through this newsletter I would like to re-introduce you back to that wonderful world of insects, once you were part of! I would like you to cherish your moments with the insect world and share the same with us all and spread the joy.

Insects are wonderful subjects to study. They account for half the number of species on earth. They are one of the most beautiful living things. Insects have adapted very well to this ever-changing world and hence they can still be found on every nook and corner on the earth.

Insects belong to the class Insecta and have 30 orders according to an NCBI report (<http://www.ncbi.org.in>) in August 2002. This includes a new order “Mantophasmatodea”, which is more popularly known as “Gladiators”. This is an insect order that has been found after a gap 87 years. Oliver Zompro from Max Planck Institute of Limnology in Germany has found this insect in Brandberg Mountains of Namibia, on the west coast of Southern Africa. It is considered to be a cross between a Stick insect, a Mantid and a Grasshopper, clearly indicating dynamic feature of survival and evolution.

Moths, Skippers and butterflies form the insect order Lepidoptera. The skippers are usually counted as butterflies, but they are somewhat intermediate between the rest of the butterflies and the remaining Lepidoptera, the moths. The Lepidoptera order comprises more than 180,000 species in 127 families and 46 super-families. It is second only to the Coleoptera (the beetles). Although there are only 5 families of butterflies in the order Lepidoptera, they account for more than 20,400 known species representing about 9 % of the lepidopterans. The largest butterfly family is Nymphalidae, the brush-footed butterflies, with about 7,080 known species. Majority of Lepidoptera families belong to moths, totaling about 135,700 known species. The largest moth family is Noctuidae, the owlet moths, with about 26,300 known species.

Out of the 46 super-families in the order Lepidoptera, only two belong to butterflies, namely, Papilionoidea (comprise 4 families) and Hesperioidea (comprise 1 family). HesperIIDae family members are popularly known as skippers. As mentioned-above, they resemble both moths and butterflies and hence are thought to be the link between them. There are about 4000 species of skippers identified and 330 of them can be found in India alone. Skippers are very difficult to identify in the field and hence only few are researching this family.

Four families that belong to the Super Family Papilionoidea are Papilionidae (swallowtails), Pieridae (Whites and Yellows), Lycaenidae (Blues) and Nymphalidae (Brush –Footed). These four families together constitute about 13700 species. In India, there are about 1501 species of butterflies and at least hundred more are waiting to be discovered.

In India roughly around 15000 species of moths can be found. Unfortunately, only a handful of people are working on Indian moths and hence information is scarce. Other than some information about few pests, we know nothing about the wild species and I believe that people like Peter Smetacek, Dr Naresh Chaturvedi and Dr. Shubhalaxmi, who are working on moths, will gather more information about these lovely creatures.

That was a brief introduction to insects in general and Lepidoptera in particular. I am very happy to present you this newsletter that is unique. Although, right now there are only few contributors and subscribers for this newsletter, I hope as it becomes more popular, it will grow into a good scientific journal with all the lepidopterists around Asia contributing to it.

Since this newsletter is still in its infancy, it is difficult to get serious articles for the newsletter and I am trying my best to get good writers and informative articles to be included in this Newsletter. Knowledgeable lepidopterists and entomologists have reviewed these articles and hence chances of erroneous data getting published are remote.

I request all the entomologists of India to contribute to this newsletter. In India, pest control is more popular than the general natural history studies and I urge the entomologists to orient their studies and students towards natural history studies as well. It's very important to know about these species if we want to conserve it and we don't know our wild insects well.

I also request the general public to kindly subscribe to this newsletter and contribute towards insect conservation which is still less known as compared to that of mammals and birds.

The main motive behind starting this newsletter is to get more insights about the life cycle of insects and using them as “**Umbrella species**” for the conservation of our wildlife. Studies have shown that insects are the best bio-indicators than any other group and hence their population, life cycle and adaptive-ness can be used as a pointer to understand crisis that staring into our eyes and we can make use of this knowledge to save and protect our remaining natural habitats. Of course, this sounds like an up hill task, but if we all get together and persist and focus our efforts with defined objectives, this can be realized.

Happy insecting,
Kishen Das
Editor, Mysore

The origin of butterflies in relation with the geological history of earth - when and where?

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Few people can resist being charmed by the sight of a brilliantly psychedelic butterfly fluttering around in the sun. Their aesthetic appeal has made them objects of passion not only to the hobbyist but also to the serious zoologist. Over the years, an amazing amount of knowledge about the natural history of these dainty wonders of nature has been gained, and such extensive knowledge about a single group of organisms is unrivalled among the invertebrates. Though it seems rather unfortunate that the other less prepossessing forms such as the dipterans or moths or even within the butterflies the not so beautiful hesperids (skippers) have been neglected, it has been a boon to science in some ways. Due to the available information on their ecology, butterflies have been the choice group of animals to work with in evolutionary studies for many years and have been hailed as model-organisms in evolutionary biology. 'The story of evolution is written on the wings of the butterflies, if only we could learn to read it'- writes Brigadier Evans in his book 'The identification of Indian butterflies'. Though we have been learning more about nature and evolution through them, we still know precious little about how, when and where butterflies evolved.

Evolutionary biologists have found out that butterflies evolved from moths. It has also been discovered that the hedylid moths (Family: Hedyliidae) are more closely related to butterflies than other moths and thus may help us understand how butterflies evolved from moth-like ancestors. We still do not know what group of moths, other than the hedylics, are the closest living relatives of butterflies. We also still do not have an idea of the precise circumstances that led to their evolution from moths, and there have been different hypotheses, which are mere speculations in the lack of evidence. It is unlikely that we will ever find a good answer to this puzzle. The other questions of where and when butterflies evolved have been debated fiercely among evolutionary biologists.

A simplified account of the part of geological history of the earth, specially plate tectonics (or continental drift) that concerns butterflies has been outlined here, to permit easy understanding of the discussion to follow. This was initially proposed by Alfred Wegener (1880-1930), with subsequent modifications. Millions of years ago the continents were all bound together in one huge super-continent called 'Pangea'. This supercontinent gradually split into two parts with the Northern part consisting of the foundations of the present day Europe, North America, Asia (minus India and the South-East Asian Islands), called 'Laurasia'. The southern part, called Gondwana was made up of Africa, Madagascar, South America, Antarctica, Australia, New Zealand, and India. The two landmasses were separated by a circum-equatorial sea called the Tethys Sea. Laurasia split up into two blocks - Asia+Europe and North America. These two landmasses were intermittently connected and separated until recently, permitting migration of the plants and animals present at that time. Connection initially existed between North America and Asia, whereas later connections were mainly between Europe and North America.

The history of Gondwanaland in the south was more complicated. It started breaking up roughly at the same time as Laurasia. India and Madagascar were the first to split off from the huge super-continent and began a northward drift towards Laurasia. At some point in time Madagascar was severed from India, and India continued its northward journey and eventually it docked with Eurasia (Europe + Asia). This led to the well-known rise of the Himalayan mountain range. Down South, and back in time, Africa was attached to South America (which is evident to this day from the shape of the Africa west coast and South American east coast) and the rest of Gondwana. Africa was the next continent to be fully detached from Gondwana followed by New Zealand. Africa drifted northwards to attain its present position, and Madagascar came to lie next to it. Antarctica, during the time of Gondwana was tropical and served as a link for the exchange of fauna and flora between Australia and South America. The three blocks were eventually separated and strong cold winds started circling around Antarctica, which led to the glacification of Antarctica. The Australian plate drifted northwards and hit the Eurasian plate, leading to the uplift of the Southeast Asian islands.

Historically, butterflies were thought to have evolved in the Northern Hemisphere (Europe, specifically) followed by dispersal all over the world. This was before the theory of continental drift. With the acceptance of the theory of continental drift, this was abandoned and there were two major theories put forward - Pangean and Gondwanan origin. The idea that butterflies were present before the break-up of Pangea has since been rejected. Butterflies feed on angiosperms. Based on fossil evidence and molecular dating techniques*, it has been shown that angiosperms evolved after the break-up of Pangea into Laurasia and Gondwana. A Gondwanan origin began to be discovered in other insects, birds, vertebrates, etc. With this, the idea of a Gondwanan origin for butterflies received increasing support.

The most ancient fossil of butterflies is about 50 million years old and belongs to the family Papilionidae. Papilionids are primitive butterflies- they evolved earlier than

the nymphalids, pierids, lycaenids and riodinids (Family: Riodinidae - small group of butterflies previously included within the Family: Lycaenidae). The estimated age of 50 mya (million years ago) is sometime after India, Madagascar and Africa were separated from Gondwana and when South-America, Australia and Antarctica were still connected together. This proves that butterflies existed before Gondwana broke up completely. It still does not tell us whether they existed before Gondwana started breaking up.

The extremely high diversity of butterflies in South America has prompted some to suggest that they evolved in that region before Gondwana broke up completely. The hedyliid moths are distributed only in South America and this has been used to support an origin in South America of the butterflies. There is yet another group of historical biogeographers who argue for an Asian origin of butterflies. Almost all the fossils of butterflies have been discovered in the Northern Hemisphere. This seems to support a Northern Hemisphere origin. However it is well known that the butterfly fossils are not well preserved due to their soft body parts, and thus the lack of fossils in the Southern Hemisphere is not taken as proof of a Northern Hemisphere origin.

The debate continues. At present, there are three major theories of origin - one in Asia, one in the South America + Australia + Antarctica block and one in Gondwana before fragmentation. Hopefully we shall soon have an answer to this question. Improved molecular dating techniques and the discovery of more fossils would go a long way in helping us solve this riddle.

* Molecular dating is different from carbon dating. Molecular dating involves using DNA or RNA sequences to estimate the dates of lineages based on an assumed mutation rate.

A Note on Atlas Moth (*Attacus atlas*)

Dr. Shubhalaxmi
BNHS, Mumbai

Common name: Atlas Moth

Latin name: *Attacus atlas*

Wingspan: 8-11.5 inches

Characters: The adult is a huge moth richly colored in hue of reddish-brown with distinct patterns. The upper wings are large and broad with the apex pronounced, while the lower wings are somewhat circular in shape and smaller in size. On both the wings, a single triangular transparent patch is present on each wing, which is very a remarkable character of the moths belonging to the wild silk moths family. Body is stout, short, furry, and beautifully decorated by the circular spots present on the sides. The caterpillar is bulky and bluish green in color with tubular structures emerging from the body.

Occurrence: An inhabitant of tropical countries, found throughout India and South East Asia. Though a rare species, but still survives in evergreen forests. The best time to find this moth or its caterpillars is during August-September.

Meet the world's largest and most handsome moth from the Insect Kingdom. If you are lucky to encounter this beauty, you will be left spellbound and will wonder what it might take to the creator to create this piece of art. If you happen to hold this moth in your palms then you will find a 'handful of moth' and release it fly, it flies almost like a bird and doesn't look like a moth then.

Atlas moth belongs to the wild silk moths group, which are also known as Emperor moths, certainly for the satire and attitude they carry. Did you know? This wonderful huge moth does not feed at all, as it doesn't have mouth. In fact all emperor moths lead a very brief adult life, which may be of 2 weeks duration only. But the caterpillar stage is pretty long and feeds for almost a month or so. The maximum size of a fully-grown caterpillar would be 10-12 cm and as thick as our index finger. The caterpillar feeds on variety of plants both forest and garden plants. Some of the popular food plants are; queen flowers, Guava, Custard apple, Casurina etc. The cocoon formation takes place among the leaves and the caterpillar secretes a coarse silk and it starts entrapping itself in the cocoon. Usually the adults emerge from the cocoons within a month time, but if the climatic conditions are not favorable, they may emerge in the next season and that would take 1-2 years.

Adults can be discriminated for the sex, based on the body characters. Males are small and dark coloured with narrow abdomen and have feathery antennae. Females are large and paler. Their abdomen are huge and bulky as they are loaded with eggs and the antennae is very slender and less pronounced. As the adult life is very brief, the main aim of their life becomes only to reproduce before they die. Males emerge from the cocoons and fly in search of females. Females usually do not fly, as they are loaded with eggs. Males locate the females through her pheromones (sexual attractants). Females after emergence from the cocoon they crawl, before their wings are fully developed to a suitable position to enable maximum dispersal by the wind of powerful sexual attractants. These can be detected by the males two or three miles down-wind. The mating may last for few hours, immediately after which the female lays her 200-300 eggs. Both males and females die after they finished their said task.

This group of moths are also known to reproduce without mating, a process called parthenogenesis. Usually females lay unfertilized eggs, which may either give birth to only males or only females.

This being a rare moth found in well-forested areas, act as indicators of the health of the forests. Degradation of the habitat is the constant threat, which this beautiful moth is facing. Besides, it has been also heavily collected for the illegal trade of butterflies and moths. In the busy lanes of Bangkok markets mounted specimens of Atlas moth is sold for Rs. 150/- each.

A request from Bill Oehlke, Canada on Saturniidae Family

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I am very interested in obtaining information about and pictures of the Saturniidae (giant silkmoths of India). I can send dried specimens (moths and/or butterflies) of Prince Edward Island, Canada, in exchange or can offer free membership to the World's Largest Saturniidae Site membership club. My email is oehlke@islandtelecom.com

Some websites to visit:

Saturniidae Livestock <http://www3.islandtelecom.com/~oehlke>

Sphingidae of the Americas <http://www.silkmoths.bizland.com/usatable.htm>

North American Catoacla <http://www.silkmoths.bizland.com/catocala.html>

Two outstanding membership sites:

World's Largest Saturniidae Site <http://www.silkmoths.bizland.com/indexos.htm>

Caterpillars Too! <http://www.silkmoths.bizland.com/ButterflyIntro.htm>

Butterflies Of Melkote Temple Wildlife Sanctuary, Karnataka

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Melkote Temple Wildlife Sanctuary (49.82 sq. km) situated in Mandy district, Karnataka was declared as Wolf sanctuary on 17th June 1974 specifically to protect them. This is named after the famous Melkote Narasimhaswamy temple just on the outskirts of the sanctuary. The sanctuary comprises of two zones, Mudibetta (4.48 sq. km) and Narayandurga (45.34 sq. km). There are a number of villages between the two zones, and surrounding area is well-cultivated. The landscape is rocky, with tropical dry deciduous and scrub vegetation.

It is located in Mandya district, the major area from 12°37' to 12°44'N latitude and 46°34' to 76°39'E longitude and the other from 12°41' to 12°43'N latitude and 76°39' to 76°41'N longitude. Altitude varies from 880 to 1127 m, the highest point being Gavikallu Betta (1127 m) (also known as Karikallu gudda) in the south. Mudi Betta, 1065 m; Narayana Durga, 1094 m are the other peaks situated in the Sanctuary. Adjoining, famous Temple Melkote's southern range is 1069 m height. Not less than two-dozen water bodies can be counted in and around the Sanctuary. Temperatures range from 17° to 38°C, and the mean annual rainfall is 621 mm.

Tropical dry land scrub forest dominates the area. Once abundant, *Cycas circinalis*, an endangered gymnosperm is suffering from decimation partly from its weak reproductive arrangement and by decorators who are after its leaves. *Shorea roxburghii*

exists in the sanctuary near Narayana Durga. Other species include *Terminalia chebula*, *Chloroxylon swietenia*, *Chloroxylon swietenia*, *Angogeissus latifolia*, *Santalum album* and *Zizyphus sp.* Mammals of the area include wolf, leopard, jungle cat, Indian fox, wild pig, bonnet macaque and pangolin. The sanctuary is quite rich in butterfly and bird life.

The sanctuary was regularly visited over five years in all seasons, more frequently in monsoon till December to take stock of butterfly diversity. The vegetation, very rich in butterfly food plants both for larvae and adult hosting considerably a good number of species. At present checklist has reached 114 species. Vegetation can be judged by the rich diversity of the butterflies recorded here.

The Sanctuary falls under the migratory path of Dark Blue Tiger, Double Branded Crow and Common Crow. Huge congregation of these butterflies was recorded in the last three years (2002-2005) both on forward and return migration.

ORDER LEPIDOPTERA

FAMILY PAPILIONIDAE

Subfamily Papilioninae

<i>Troides minos</i>	Common Birdwing
<i>Pachilocta aristolochiae</i>	Common Rose
<i>Pachilocta hector</i>	Crimson Rose
<i>Graphium sarpedon</i>	Common Jay
<i>Graphium doson</i>	Tailed Jay
<i>Papilio demoleus</i>	Common Lime
<i>Papilio polytes</i>	Common Mormon
<i>Papilio polymnestor</i>	Blue Mormon
<i>Papilio crino</i>	Common Banded Peacock
<i>Pathysa nominus</i>	Spot Swordtail

FAMILY PIERIDAE

Subfamily Coliadinae

<i>Catopsilla pomona</i>	Common Emigrant
<i>Catopsilla pyranthae</i>	Mottled Emigrant

<i>Eurema brigitta</i>	Small Grass Yellow
<i>Eurema laeta</i>	Spotless Grass Yellow
<i>Eurema andersoni</i>	One-spot Grass Yellow
<i>Eurema hecabe</i>	Common Grass Yellow
<i>Eurema blanda</i>	Three-spot Grass Yellow
<u>Subfamily Pierinae</u>	
<i>Delias eucharis</i>	Common Jezebel
<i>Leptosia nina</i>	The Psyche
<i>Cepora nerissa</i>	Common Gull
<i>Anaphaeis aurota</i>	The Pioneer
<i>Colotis calais</i>	Small Salmon Arab
<i>Colotis etrida</i>	Little Orange Tip
<i>Colotis eucharis</i>	Plain Orange Tip
<i>Colotis danae</i>	Crimson Tip
<i>Colotis fausta</i>	Large Salmon Arab
<i>Ixias marianne</i>	White Orange Tip
<i>Ixias pyrene</i>	Yellow Orange Tip
<i>Parenonia valeria</i>	Common Wanderer
<i>Hebommoia glaucippe</i>	Great Orange Tip

FAMILY NYMPHALIDAE

Subfamily Satyrinae

<i>Melanitis leda</i>	Common Evening Brown
<i>Elymnias hypermenstra</i>	Common Palmfly
<i>Lethe europa</i>	Bamboo Treebrown
<i>Lethe roharia</i>	Common Treebrown
<i>Mycalesis perseus</i>	Common Bushbrown

<i>Mycalesis mineus</i>	Dark-brand Bushbrown
<i>Ypthima asterope</i>	Common Threering
<i>Ypthima hubneri</i>	Common Fourring
<i>Ypthima baldus</i>	Common Fivering
<i>Orsotriaena medus</i>	The Nigger

Subfamily Charaxinae

<i>Charaxes bernardus</i>	Tawny Rajah
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Subfamily Heliconiinae

<i>Acraea violae</i>	Tawny Coster
<i>Phalanta phalanta</i>	Common Leopard
<i>Argynnis hyperbius</i>	Indian Fritillary

Subfamily Limenitinae

<i>Neptis jumbah</i>	Chestnut-streaked Sailer
<i>Neptis hylas</i>	Common Sailer
<i>Neptis columella</i>	Short-banded Sailer
<i>Euthalia aconthea</i>	Common Baron
<i>Euthalia lubentina</i>	Gaudy Baron
<i>Euthalia nais</i>	Baronet
<i>Ariadne ariadne</i>	Angled Castor
<i>Ariadne merione</i>	Common Castor

Subfamily Nymphalinae

<i>Junonia hierta</i>	Yellow Pansy
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<i>Junonia orthiya</i>	Blue Pansy
<i>Junonia lemonias</i>	Lemon Pansy
<i>Junonia almanac</i>	Peacock Pansy
<i>Junonia atlites</i>	Grey Pansy
<i>Junonia iphita</i>	Chocolate Pansy
<i>Hypolimnna bolina</i>	Great Eggfly
<i>Hypolimnna misippus</i>	Danaid Eggfly

Subfamily Danainae

<i>Parantica aglea</i>	Glassy Tiger
<i>Tirumala limniace</i>	Blue Tiger
<i>Tirumala saptentrionis</i>	Dark Blue Tiger
<i>Danaus chryssipus</i>	Plain Tiger
<i>Danaus genutia</i>	Striped Tiger
<i>Euploea core</i>	Common Crow

FAMILY LYCAENIDAE

Subfamily Miletinae

<i>Spalgis epius</i>	Apefly
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Subfamily Polyommatae

<i>Castalius rosimon</i>	Common Pierrot
<i>Tarucus extricates</i>	Rounded Pierrot
<i>Leptotes plinius</i>	Zebra Blue
<i>Azanus ubaldus</i>	Bright Babul Blue
<i>Azanus uranus</i>	Dull Babul Blue
<i>Azanus jesous</i>	African Babul Blue
<i>Everes lacturnus</i>	Indian Cupid

<i>Acytolepis puspa</i>	Common Hedge Blue
<i>Pseudezizzeria maha</i>	Pale Grass Blue
<i>Zizeeria carsandra</i>	Dark Grass Blue
<i>Zizina otis</i>	Lesser Grass Blue
<i>Zizula hylax</i>	Tiny Grass Blue
<i>Chilades laius</i>	Lime Blue
<i>Chilades parrhasius</i>	Small Cupid
<i>Chilades pandava</i>	Plains Cupid
<i>Freyeria putli</i>	Southern Grass Jewel
<i>Euchrysops cnejus</i>	Gram Blue
<i>Catochrysops starbo</i>	Forget-me-not
<i>Lampides boeticus</i>	Pea Blue
<i>Jamides bochus</i>	Dark Cerulean
<i>Jamides celeno</i>	Common Cerulean
<i>Nacaduba hermus</i>	Pale Four-line Blue
<i>Nacaduba</i>	Large Four-line Blue
<i>Prosotus nora</i>	Common Line Blue
<i>Prosotus dubiosa</i>	Tailless Line Blue
<i>Talicauda nyseus</i>	Red Pierrot
<i>Anthene lycaenina</i>	Pointed Ciliate Blue

Subfamily Theclinae

<i>Spindasis vulcanus</i>	Common Silverline
<i>Rathinda amor</i>	Monkey Puzzle
<i>Tajuria cippus</i>	Peacock Royal
<i>Rapala iarbus</i>	Indian Red Flash
<i>Rapala schistacea</i>	Slate Flash

Rapala varuna

Indigo Flash

FAMILY HESPERIIDAE

Subfamily Coeliadinae

Hasora chromus

Common Banded Awl

Badamia exclamationis

Brown Awl

Subfamily Pyrginae

Sarangesa dasahara

Common Spotted Flat

Sarangesa purendra

Spotted Small Flat

Gomalia elma

African Marbled Skipper

Spialia galba

Indian Skipper

Subfamily Hesperinae

Ampittia dioscorides

Bush Hopper

Suastus gremius

Indian Palm Bob

Gangara thyrsis

Giant Redeye

Matapa aria

Common Redeye

Taractrocera maevius

Common Grass Dart

Tealicopta ancilla

Dark Palm Dart

Borbo cinnara

Rice Swift

Pelopides mathias

Small Branded Swift

Acknowledgments:

Above result would not have been possible without following friends; Sumanas Koulagi, Sharath.A, Abhilash.A, Kishen Das K.R, Thejaswi.S, Mohan Kumar.M, Yashaswi.S, Girija.T, Deapesh Mishra, Ritesh, Rohini, Sadananda. K.B., Siddaramaiah B., Sampath Kumara K.K, Guruprasad.P and Manu.K.

Events Diary

ButterflyIndia Meet 2005 Aralam Wildlife Sanctuary (ALS), Kerala 16th to 18th September 2005

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Introduction to Butterfly India:

About 4 years ago, ten friends got together and started this group. The main objective of this group is to discuss and share information about butterflies in India. As time went by, amateurs and experts alike joined this group. As of now, we are a 325 member strong group and growing. The specialties of this group are as diverse as the background of its members. Professional photographers, scientists, conservationists, amateurs, nature lovers all are part of this group and hence lot of photos and scientific information are shared every month.

ButterflyIndia and Conservation:

So how this group is helping in conservation? First of all since this group is bringing more information about the natural history of butterflies, this will definitely help us to come out with a better strategy for conservation. Many studies have proved that butterflies are one of the best bio-indicators because of their close association with their host plants. So we can use the butterflies as umbrella species in conserving nature.

Apart from this, now whoever is interested in writing an article or a book on Indian butterflies, don't have to look anywhere else for information as they are all part of this same group. Group meetings provide a common platform to discuss about different aspects of butterflies.

This group also attracted the general public into "butterflying" and thus bringing them more closely to nature. Since the children are also attracted to butterflies by default, it's very easy to incline them towards nature and its conservation through butterflies.

About the Butterfly Meet:

This was the second meet of ButterflyIndia group, since it started. Malabar Natural History Society (MNHS) and Forest Department of Kerala were the organizers of this meeting, which was coordinated by Mr. Vijay Barve, the moderator of ButterflyIndia Yahoo group. There were around 60 participants, which included experts, amateurs, and photographers. This meet was held at Aralam Wildlife Sanctuary in Northern Kerala between 16th and 18th of September 2005.

About Aralam Wildlife Sanctuary:

Aralam is located on the western slopes of the Western Ghats. This sanctuary, which is only 55 Sq km in area, is the northern most wildlife sanctuary of Kerala and probably smallest protected area. It was established in 1984. The nearest forest office is in Iritty, a small town about 55 kms from Kannur. Since this sanctuary is adjacent to Brahmagiri Wildlife Sanctuary, lot of coorg elements can be seen here. The Chief Wildlife Warden, Mr. Uthaman and the RFO, Mr. Jaimadhavan, were present through out this meet and offered a wonderful accommodation and food for the participants. We thank them for their generosity.

Day 1:

Participants started arriving on the early morning of Sept 16th. The forest department arranged for their travel from Iritty to Aralam Wildlife Sanctuary. There was a small outing session with S Karthikeyan (WWF, Bangalore) for the early butterflies. Malabar Raven, Tailed Jay, Mating Pair of Blue Mormon, Common Mormon, Large Blue Oak Leaf and Great Orange tip were some of the butterflies seen during this outing. By the end of this field outing many participants from Mysore and few more from near by places joined us. We were lucky to see a pair of Ceylon Frogmouth, an endemic bird in front of the forest department office.

After the outing, the registration started. For working professionals the fee was Rs. 200 and for students it was Rs100. Many publications and T-shirts from MNHS were also on display and sale during registration. The registration kit consisted of two previous issues of the newsletter of MNHS called Malabar Trogon, membership form of MNHS and few articles related to our butterflies were distributed.

Many of the participants were seen buying the butterfly book of Dr Jaffer Palot (ZSI, Calicut) titled “ Keralattil Chitrashelabam” written in Malayalam, which even contains the local Malayalyam names for our butterflies. This is a very good book for amateurs with lot of colored photographs. Incidentally this is the first book on our butterflies written in a local Indian language.

Inauguration:

This meet was officially inaugurated by Shri. TNA Perumal, whom I refer to as a “Gentleman”. On the dais were, Uthaman, Chief Wildlife Warden of ALS, Vijay Barve moderator of ButterflyIndia, Dr Mayilvahanan, naturalist from Salem and C Sashikumar.

Vijay Barve gave a small introduction about the ButterflyIndia group and the schedule of the Meet. Perumal ji talked about the importance of nature and conservation. Uthaman gave a very informative presentation on the bio-diversity of ALS, which was followed by a talk from Sashikumar, on the flora and endemism of the place.

In the evening we had a small outing. I managed to photograph the “Southern Duffer”, relatively a rare species. Butterfly host plant expert V.C. Balakrishnan spotted the caterpillar and pupae of Common Imperial. Everyone got excited seeing the life cycle of Common Imperial. The ants were seen attending the caterpillars. The pupae were very difficult to spot because of their excellent camouflage. Two females were seen hovering around its host plant trying to lay eggs.

Session By Shri TNA Perumal:

After the outing we had a session on Butterfly Photography by Perumalji. During his talk he explained the importance of composition, subject, light and background while taking the photos. He was able to convince the audience about the importance of photography in nature conservation. He also had few instructions for the amateur photographers regarding the destructive nature of photography and ethics to be followed. He ended the talk with a slide show of his excellent nature photos. If you are a nature freak then you must meet this person at least once in your lifetime. Although he is 73, the amount of enthusiasm and humbleness to learn is amazing. Our group from Mysore had the opportunity to interact with him in Kannada and we were very lucky to hear his wildlife experiences.

After this we had some wonderful dance and song performances by the participants lead by K. C. Balakrishnan. One of the songs was sung by Dr Jaffer Palot himself. There were few Marati songs as well from the Mumbai group. After the dinner, 5 groups were formed for the next day’s nature trial.

Day-2:

Since many of the butterflyers also happened to be avid bird watchers, they went for a bird watching session in the early morning. During this outing Grey wagtail, Besra, Forest Jungle Owlet, Ceylon Frogmouth, Malabar Parakeet, Racket Tailed Drongo, Black Drongo, Scarlet Minivet are some of the bird species seen. After the breakfast everyone was charged up for the long nature trial. Different trials were selected for different groups so as to cover all types of habitats found in ALS. Before we started, the flying lizard (*Draco dussumieri*) appeared from nowhere onto a tree in front of the seminar hall. It’s yellow flap, which was popping out after every few seconds looked as if it’s saying “ All the best “ to the groups.

Field Outing:

Our group was headed by K. A. Subramanian (NCBS, Bangalore) and we went to a place called “MeenMuttu”, which is around 14 kms from the dormitory. We used jeep for transportation and unfortunately our Jeep crushed a Viper while going. “MeenMuttu” has got a very beautiful falls located amidst the evergreen belt of ALS. By the time we reached the falls there was a troop of Lion Tailed Macaques, as if they were waiting to welcome us. Since they were high on the trees and light was low, we were unable to take any snaps. We also saw a Forest Cane Turtle near the falls. On the way back there were Malabar Pit Vipers in two different color forms, lots of frogs, mushrooms and

unfortunately only 13 species of butterflies. Clear winged Forest Glory was the commonest damselfly we saw during our nature trial. We were the only group, which managed to see so less number of butterflies!!! We had to stop halfway, as it was raining heavily and was getting late for the next session. We once again took the jeep on our way back.

After the outing, the team leaders were asked to share their experience. The number of butterfly species seen by different groups varied from 13 to 55, our group being at the last. One of the other groups saw around 47 species, which included 12 species of swallowtails. They also managed to find a pupa, which the experts found difficult to identify. Although we saw very less number of butterflies, our trial was very good as we saw so many varieties of Frogs, Reptiles, Mushrooms, Birds, Damselflies, Millipedes, Snails and of course the Leeches.

Talk on Butterfly Migration:

After lunch, we had a session on Butterfly Migration by Dr. Jaffer Palot and Dr. P. Pramod (SACON, Coimbatore). Dr. Jaffer Palot talked about earlier work on migration and shared his own experiences. Easwaran Raju, from SACON is working on butterfly migration and was supposed to come for the meeting to talk about migration. In his absence, Pramod took the session instead. Pramod talked about the probable reasons for migration, tentative migratory path, breeding and expressed the need of a network for such studies. All the slides were excellent and provided a good insight into the subject.

Nature Education through Butterfly Watching:

After the tea break, we had an introduction to butterfly watching by S. Karthikeyan. He took us back to 1980, when there were only bird watchers and when there was a dire need for someone to take up interest in insects. He realized this need and started butterfly watching without any field guides. The Calendar with photos of butterflies was his first field guide. He explained about how he tried to make butterfly watching a popular hobby through different means like slideshows, nature camps, talks and writing articles. He stressed the need of studying the butterflies as against just making a checklist. He also explained how collection of specimens could be avoided for natural history studies and wondered why some of the people collect butterflies just for passion. He was happy about the ButterflyIndia group and the way its attracting more people towards butterfly watching. He concluded his talk explaining about the importance of conservation of butterflies.

Conservation Education:

Karthik's session was followed by a session on conservation education from Pramod P. This was one of the best talks we had in this meet. Pramod started off explaining how he struggled initially in coimbatore to establish himself and how he managed to make teachers and students interested in conservation. He explained one of the projects on the "Benefits of organic farming over chemical farming" in which the

students were actually able to convince the local farmers to implement organic farming. Later he explained the activities conducted by SACON to incline children towards nature and its conservation. His innovative methods of inclining students towards nature impressed the audience. His energetic talk mixed with humor, left the audience lingering in the SACON campus in Anaikatty.

After the dinner, we saw some excellent butterfly photos taken by Yuwaraj Gurjar, an expert photographer from Thane. Some of the Lycaenid photos left every one wondering about their identification. After this there was an informal discussion about conservation education, which went on for 2 hours. Just after this meeting there were termites all over the place emerging from the ground. They got attracted towards lights and came inside our rooms and seminar hall. All the lights were switched off to make them move out of the rooms and hall. Since everyone was very tired of long nature trial, we rushed to bed.

Day-3:

Many bird watchers went for an early morning bird watching session. Some of the highlights of this bird watching session were Malabar Trogon, Scarlet Minivet and Great Black Woodpecker. Just after this outing, it started raining heavily.

Introduction to Moths by Alka Vaidya and Alka Bhagwat:

In India there are only a handful of people working on the natural history of moths. Dr Shubhalaxmi, who happens to be one of them, is studying the life cycle of moths. She also conducts a “Distance Learning in Basic Entomology” program in BNHS for people interested in knowing the basics of our insects. She was supposed to come for the meet, but unfortunately because of her busy schedule she could not make it.

In her absence, upcoming lepidopterists Alka Vaidya and Alka Bhagwat, students of Dr. Shubhalaxmi, conducted the session on moths. Alka Bhagwat started off explaining the camp-sites in Matheran and Malshej Ghat, where they are doing their studies. She also talked about the collection of moths and its importance. Later Alka Vaidya took over and explained about the characteristics of different moth families. For some of the families she also explained the natural history of caterpillar and cocoon. The slides were excellent with photos of lifecycles and information about moths. She concluded her session asking everyone to generate interest in moths, which are much more diversified and colorful than butterflies.

Dragonflies – Emerging field by K. A. Subramanian:

Although this was supposed to be a butterfly meet, we do love all the insect orders. And this session was a reflection of that. K. A. Subramanian is a scientist working in NCBS who is currently writing a field guide for Dragonflies and Damselflies. Since not many people were familiar with the order “Odonata”, he started off with basic introduction. He explained about the classification, body parts, distribution, diversity,

families, predators and importance of them in nature. His slides were very informative with beautiful photos taken by himself and E. Kunhikrishnan. I am sure after his talk many of the butterfly watchers would have thought about moving to Damselflies, which are more fragile and beautiful than our butterflies.

This was followed by another session on Odonata by Dr. Francy Kakkasery. Dr. Francy is an expert on our "Odonata" who is currently a Senior Lecturer, at St.Thomas' College, Trichur. His talk was technical and the audience struggled a bit trying to understand. He explained the differences between each of the families using the wing venation and coloration and also the behavioral aspects. He also concluded his talk explaining about the role of dragonflies and damselflies in nature and expressed concern over Indian wildlife, which is degrading day by day.

Last outing of the Meet:

Just after his talk, myself and my good old friend Shivaprakash (Naturalist from Mysore) left for a nature trail even without waiting for the breakfast. I was desperate to see more butterflies, as I did not see much for first 2 days because of heavy rains. Indeed we were not disappointed!. During our trail, we got to see few TreeBrowns mud-puddling. Some of them were feeding on the sap from the trees. Few Large Blue Oakleafs were seen chasing each other and after each chase, one of them used to sit high on the leaf basking with its wings, slowing opening and closing. Common Spotted Flat, Chestnut Bob, Suffused Snow Flat, Water Snow Flat and Coon were some of the skippers, which were commonly seen. Blue Mormons and Red Helens were all over place flying with their majestic and strong flight. Common grass yellows were flying non-stop parallel to roads near to the bushes. I wonder what they were up to. Shivaprakash showed me one of the endemic fresh water fish species whose color pattern matched with that of the Zebra; I forgot its actual name. Then there was a Brown Fish Owl sitting high on one of the trees near the stream. We heard a lot of disturbance where this fellow was sitting; probably some of the smaller birds were scared. I took 2 snaps and it while it flew off. Then we headed towards the mud-puddling spot near the stream, where great orange tip, common emigrant, blue mormon, common jay and many more butterflies were seen flying across the stream. No Common blue bottles were seen and there were only common jays. Large oak blue was also seen flying in hurry as it always does. Its metallic blazing blue, in the background of lush green canopy, made its coloration look even brighter. A lone chocolate albatross was also seen puddling. When we were watching all these butterflies, a common palmfly emerged out of the bamboo thickets, just like an angel in a mud patch. Its brick red coloration and the angelic flight together make it one of the most beautiful butterflies in South India. We were lucky to see the malabar tree nymph and the malabar banded peacock. Till now I have never seen a malabar banded peacock, either puddling or resting, so not able take its photos.

Since we were too excited to see so many butterflies, we never realized about the time. Only when our other friends from Mysore joined us and told us about the timings of valedictory function, we came to know that it is already over. Although we missed the

valedictory function, we were very happy about our butterfly sightings. On the way back we heard great black woodpecker and a small group of scarlet minivets were also seen. Meanwhile the forest department guys caught a huge python, which has fed on a Cat. Around 25 of us gathered around the python to take snaps from all possible angles. Python was huge, majestic and was looking at us with its bright eyes. Although there were many photographers, it only posed to TNA Perumalji, probably even the Python knew who could take a better snap of it!!!

After the lunch, every one packed their luggage and were all set for the journey back home. I enjoyed every bit of this meet and was glad to see so many butterfly watchers together. I very badly missed Krushnamegh Kunte, C Susanth, Isaack Kehimker, Suresh Elamon, Easwaran Raju, Dr. Shubhalaxmi and E. Kunhikrishnan, but was very happy to be with the experts who were present throughout meet. May be someday we will have all these experts together including Dr. Kumar Ghorpade, Dr. Harish Gaonkar and Peter Smetacek, that will be like my dream coming true.

Acknowledgments:

I would like to thank S. Karthikeyan, Dr. Francy Kakkasery, C. Sashikumar, Dr. Jaffer Palot, C. Sashikumar, Alka Vaidya, Alka Bhagwat and TNA Perumalji for attending the Butterfly Meet and sharing their expertise. My special thanks to K. A. Subramanian for introducing us to a wonderful world of “Odonata” and for the identification of damselflies, dragonflies, turtle and some of the birds. I enjoyed the company of Yuwaraj Gurjar, Amol Patwardhan, David Raju, Nelson, Mohandas, Niranjana, Vijay Barve, Narayani Barve, Arvind, V. C. Balakrishnan, Vidya, Priya and everyone who was present at the butterfly meet. On behalf of all the participants I would like to thank MNHS and forest department, Kerala for organizing this meet.

I am attaching the list of birds and butterflies seen during this trip. This checklist has been compiled by A. Shivaprakash, with the help Sahana, D. H. Tanuja, Girija Shivaprakash, Mohan M, Sandeep S, Kishen Das, Alka Vaidya, Sashikumar, M. Sathyan and David Raju.

Checklist of Butterflies

ORDER LEPIDOPTERA

FAMILY PAPILIONIDAE

1 <i>Troides minos</i>	Southern Birdwing
2 <i>Pachilocta aristolochiae</i>	Common Rose
3 <i>Pachilocta hector</i>	Crimson Rose
4 <i>Graphium sarpedon</i>	Common Bluebottle
5 <i>Graphium doson</i>	Common Jay
6 <i>Graphium agmemnon</i>	Tailed Jay
7 <i>Papilio demoleus</i>	Common Lime

8 <i>Papilio liomedon</i>	Malabar Banded Swallowtail
9 <i>Papilio dravidarum</i>	Malabar Raven
10 <i>Papilio helenus</i>	Red Helen
11 <i>Papilio polytes</i>	Common Mormon
12 <i>Papilio polymnestor</i>	Blue Mormon
13 <i>Papilio crino</i>	Common Banded Peacock
14 <i>Papilio paris</i>	Paris Peacock
15 <i>Papilio budha</i>	Malabar Banded Peacock

FAMILY PIERIDAE

16 <i>Catopsilia Pomona</i>	Common Emigrant
17 <i>Catopsilia pyranthe</i>	Mottled Emigrant
18 <i>Eurema brigitta</i>	Small Grass Yellow
19 <i>Eurema blanda</i>	Three-spot Grass Yellow
20 <i>Cepora nerissa</i>	Common Gull
21 <i>Anaphaeis aurota</i>	The Pioneer
22 <i>Ixias marianne</i>	White Orange Tip
23 <i>Ixias pyrene</i>	Yellow Orange Tip
24 <i>Hebomoia glaucippe</i>	Great Orange Tip
25 <i>Appias lycinda</i>	Chocolate Albatross
26 <i>Pareronia valeria</i>	Common Wanderer

FAMILY NYMPHALIDAE

27 <i>Discophora lepida</i>	Southern Duffer
28 <i>Melanitis leda</i>	Common Evening Brown
29 <i>Elymnias hypermenstra</i>	Common Palmfly
30 <i>Lethe europa</i>	Bamboo Treebrown
31 <i>Lethe rohria</i>	Common Treebrown
32 <i>Mycalesis perseus</i>	Common Bushbrown
33 <i>Mycalesis mineus</i>	Dark-brand Bushbrown
34 <i>Ypthima hubneri</i>	Common Fourring
35 <i>Orsotriaena medus</i>	The Nigger
36 <i>Polyura athamas</i>	Common Nawab
37 <i>Cupha erymanthis</i>	Southern Rustic
38 <i>Vindula erota</i>	Cruiser
39 <i>Phalanta phalanta</i>	Common Leopard
40 <i>Cirrochroa thais</i>	Tamil Yeoman
41 <i>Neptis hylas</i>	Common Sailer
42 <i>Limnitis procris</i>	Commander
43 <i>Parthenos sylvia</i>	Clipper
44 <i>Junonia orithya</i>	Blue Pansy
45 <i>Junonia almana</i>	Peacock Pansy

46 <i>Junonia atlites</i>	Grey Pansy
47 <i>Junonia iphita</i>	Chocolate Pansy
48 <i>Hypolimnias bolina</i>	Great Eggfly
49 <i>Hypolimnias misippus</i>	Danaid Eggfly
50 <i>Kallima horsfieldi</i>	Southe Indian Blue oakleaf
51 <i>Parantica aglea</i>	Glassy Tiger
52 <i>Tirumala limniace</i>	Blue tiger
53 <i>Tirumala septentrionis</i>	Dark Blue Tiger
54 <i>Danaus chryssipus</i>	Plain Tiger
55 <i>Danaus genutia</i>	Striped Tiger
56 <i>Euploea core</i>	Common Crow
57 <i>Euploea sylvester</i>	Double Branded Crow
58 <i>Idea malabarica</i>	Malabar Tree Nymph

FAMILY LYCAENIDAE

59 <i>Castalius ethion</i>	Banded Blue Pierrot
60 <i>Tarucus extricatus</i>	Rounded Pierrot
61 <i>Leptotes plinius</i>	Zebra Blue
62 <i>Azanus ubaldus</i>	Bright Babul Blue
63 <i>Pseudezizzeria maha</i>	Pale Grass Blue
64 <i>Zizina otis</i>	Lesser Grass Blue
65 <i>Zizula hylax</i>	Tiny Grass Blue
66 <i>Chilades pandava</i>	Plains Cupid
67 <i>Neopithecops zalmora</i>	Quaker
68 <i>Magisba malaya</i>	Malayan
69 <i>Lampides boeticus</i>	Pea Blue
70 <i>Jamides bochus</i>	Dark Cerulean
71 <i>Jamides celeno</i>	Common Cerulean
72 <i>Rapala schistacea</i>	Slate Flash
73 <i>Cheritra freja</i>	Common Imperial

FAMILY HESPERIIDAE

74 <i>Hasora chromus</i>	Common Banded Awl
75 <i>Badamia exclamtionis</i>	Brown Awl
76 <i>Psuedocoladenia dan</i>	Fulvous pied Flat
77 <i>Sarangesa dasahara</i>	Common Small Flat
78 <i>Celaenorrhinus leucocera</i>	Common spotted Flat
79 <i>Tagiades litigiosa</i>	Water Snow Flat
80 <i>Tagiades japedus</i>	Common Snow Flat
81 <i>Tagiades gana</i>	Suffused Snow Flat
82 <i>Aeromachus pygmaeus</i>	Pygmy Grass-Scrub-Hopper
83 <i>Ampittia dioscorides</i>	Bush Hopper
84 <i>Iambrix salsala</i>	Chestnut Bob
85 <i>Psolos fuligo</i>	Coon
86 <i>Spialia galba</i>	Indian Skipper
87 <i>Matapa aria</i>	Common Redeye
88	Dart unidentified

P.S. Common Imperial life stages were shown by Mr. V.C.Balakrishnan

Checklist of Birds

Cormorants/Shags	Phalacrocoracidae
1 Little Cormorant (28)	<i>Phalacrocorax niger</i>
Herons, Egrets & Bitterns	Ardeidae
2 Little Egret (49)	<i>Egretta garzetta</i>
3 Cattle Egret (44)	<i>Bubulcus ibis</i>
Hawks, Eagles, Buzzards, Old World Vultures, Kites, Harriers	Accipitridae
4 Brahminy Kite (135)	<i>Haliastur indus</i>
5 Crested Goshawk (144-146)	<i>Accipiter trivirgatus</i>
6 Besra Sparrowhawk (149-151)	<i>Accipiter virgatus</i>
Plovers, Dotterels, Lapwings	Charadriidae
7 Red-wattled Lapwing (366-368)	<i>Vanellus indivus</i>
Sandpipers, Stints, Snipes, Godwits & Curlews	Scolopacidae
8 Common Sandpiper (401)	<i>Actitis hypoleucos</i>
Pigeons & Doves	Columbidae
9 *Emerald Dove (542-544a)	<i>Chalcophaps indica</i>
Parakeets & Hanging-Parrots	Psittacidae
10 Plum-headed Parakeet (557-558)	<i>Psittacula cyanocephala</i>
11 Blue-winged Parakeet (564)	<i>Psittacula columboides</i>
Cuckoos, Malkohas & Coucals	Cuculidae
12 Greater Coucal (600-602)	<i>Centropus sinensis</i>
Owls	Strigidae
13 Forest Eagle-Owl (628-629)	<i>Bubo nipalensis</i>
14 Brown Fish-Owl (631-632)	<i>Ketupa zeylonensis</i>
Frogmouths	Podargidae
15 \$ Ceylone Frogmouth (666)	<i>Batrachostomus moniliger</i>
Swifts	Apodidae
16 Indian Edible-nest Swiftlet (685)	<i>Collocalia unicolor</i>
Trogons	Trogonidae
17 Malabar Trogon (710-712)	<i>Harpactes fasciatus</i>
Bee-eaters	Meropidae
18 Small Bee-eater (749-752)	<i>Merops orientalis</i>
Hornbills	Bucertotidae
19 Malabar Grey Hornbill (768)	<i>Ocyrceros griseus</i>
Barbets	Capitonidae
20 Brown-headed Barbet (780-782)	<i>Megalaima zeylanica</i>
21 White-cheeked Barbet (785)	<i>Megalaima viridis</i>
22 Crimson-throated Barbet (790-791)	<i>Megalaima rubricapilla</i>
23 Coppersmith Barbet (792)	<i>Megalaima haemacephala</i>
Woodpeckers	Picidae
24 Great Black Woodpecker (830)	<i>Dryocopus javensis</i>
25 Lesser Golden-backed Woodpecker (818-823)	<i>Dinopum benghalense</i>

26 Heart-spotted Woodpecker (856)

Wagtails & Pipits

27 Large Pied Wagtail (1891)

28 Grey Wagtail (1884)

**Cuckoo-Shrikes, Flycatcher-Shrikes, Trillers,
Minivets, Woodshrikes**

29 Scarlet Minivet (1080-1083)

Bulbuls & Finchbills

30 Ruby-throated bulbul (1115-1117)

31 Red-vented Bulbul (1126-1132)

32 Yellow-browed Bulbul (1143-1145)

Ioras, Chloropsis/Leafbird, Fairy-Bluebird

33 Common Iora (1097)

34 Jerdon's Chloropsis (1107-1108)

35 Gold-fronted Chloropsis (1103-1105)

**Thrushes, Shortwings, Robins, Forktails,
Wheaters**

36 White-throated Ground Thrush (1734)

37 Eurasian Blackbird (1751-1757)

38 Oriental Magpie-Robin (1661-1664)

**Babblers, Laughingthrushes, Babaxes,
Barwings, Yuhinas**

39 *Spotted Babbler (1152-1159)

40 Jungle Babbler (1261-1265)

41 *Quaker Tit-Babbler (1389-1391)

Goldcrest, Prinias, Tesias, Warblers

42 Paddyfield Warbler (1557-1558)

Flycatchers

43 Asian Brown flycatcher (1407)

44 Red-throated Flycatcher (1411-1412)

45 White-bellied Blue-Flycatcher (1435)

Monarch-Flycatchers & Paradise-Flycatchers

46 Black-naped Monarch-Flycatcher (1465-1469)

Sunbirds & Spiderhunters

47 Purple-rumped Sunbird (1907-1908)

48 Little Spiderhunter (1931)

White-eyes

49 Oriental White-eye (1933-1936)

Drongos

50 Bronzed Drongo (971)

51 Greater Racket-tailed Drongo (976-981)

Crows, Jays, Treepies, Magpies

52 Indian Treepie (1030a-1034)

53 House Crow (1048-1051)

54 Jungle Crow (1054-1057)

Hemicircus canente

Motacillidae

Motacilla maderaspatensis

Motacilla cinerea

Campephagidae

Pericrocotus flammeus

Pycnonotidae

Pycnonotus melanicterus

Pycnonotus cafer

Iole indica

Irenidae

Aegithina tiphia

Chloropsis cochinchinensis

Chloropsis aurifrons

Turdinae

Zoothera citirna

Turdus merula

Copsychus saularis

Timaliinae

Pellorneum ruficeps

Turdoides striatus

Alcippe poicephala

Sylviinae

Acrocephalus agricola

Muscicapinae

Muscicapa dauurica

Ficedula parva

Cyornis pallipes

Monarchinae

Hypothymis azurea

Nectariniidae

Nectarinia zeylonica

Arachnothera longirostra

Zosterops palpebrosus

Zosterops palpebrosus

Dicruridae

Dicrurus aeneus

Dicrurus paradiseus

Corvidae

Dendrocitta vagabunda

Corvus splendens

Corvus macrorhynchos

* identified by Sri C.Shashikumar by call

\$ identified by Sri M.Sathyan