BIRDS

Khage, Vihangavihangamavihayasah
Shakuntipakshishakunishakuntashakunadvijah
Patattripattripatagapatatpattrarathandajah
Nagaukovajivikiravishkirapatatrayah
Needodbhava garutmantah pitsanto nabha sangamah

The many Sanskrit terms for a bird refer to its ability to fly, its companionship of the sky, possession of wings, possession of feathers, being born out of eggs, being reared in a nest, its life in a tree.

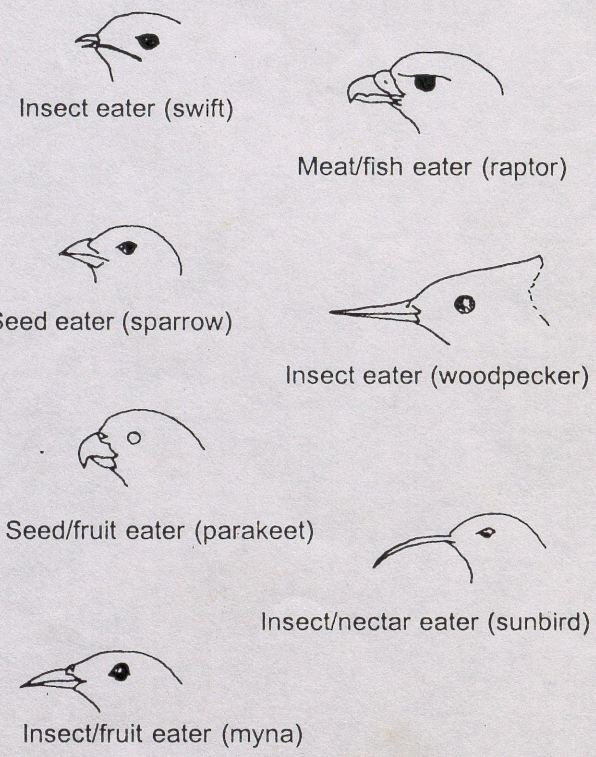
Amarakosha

Birds are "feathered bipeds", warm blooded vertebrates with bodies covered by feathers and forelimbs modified into wings.

Sarus Cranes, one of the tallest of birds stand as high as humans; sunbirds, amongst the smallest are the size of our thumbs. So birds are in a size range that appeals to us most, as do their bright colours and melliflu-ous songs. Birds have always fascinated people, who have longed to take to air after them. So birds were conferred the status of vehicles of Gods; a goose of the goddess of learning, Saraswati, a Peafowl of Karthikeya, an eagle of Vishnu. As sacred animals they may be protected, as Peafowl are in many parts of India. But they are also extensively hunted for food and feathers, and kept in cages for entertainment. Birds are the most studied group of animals, with thousands of amateur bird watchers in every part of the world; In consequence, almost all species of living birds have by now been described.

Morphological characters: Birds are superb flying machines, with all organ systems adapted for this mode of life. Their stream-lined bodies are covered with feathers, which also provide flexible, light elements to make up the wings. Their light and hollow bones keep down their weight and the lungs with air sacs provide an efficient respiratory mecha-nism. They have acute eyesight and hearing. All birds possess a frontal toothless beak; its size and shape varies a great deal and pro-vides important clues to their identity.

Types of Beaks

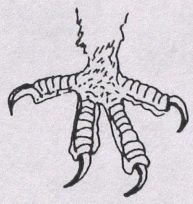


The length of legs, and especially the size and shape of the toes and claws furnish other diagnostic characters, as do size and shape of wings and flight pattern. Striking colours of the plumage, which may differ with sex and season provide other characteristic features for the different bird species.

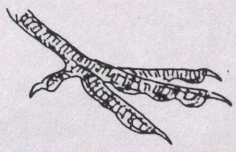
Types of legs

Swimming (duck)

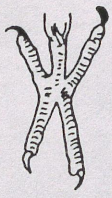
Clinging on cliff (swift)



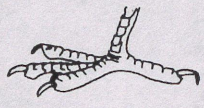
Catching prey (kite)



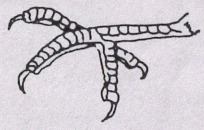
Swimming (Coot)



Climbing (parakeet)

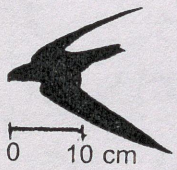


Perching (crow)

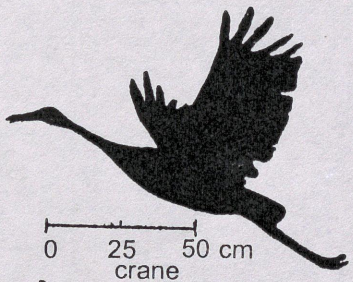


Climbing on tree trunk (woodpecker)

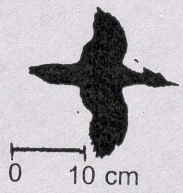
Silhoutes of flying birds



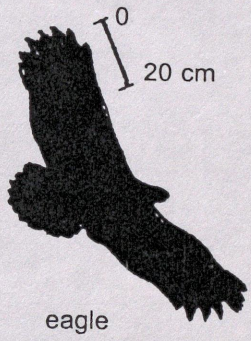
Alpine Swift



crane



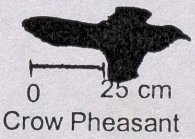
woodpecker



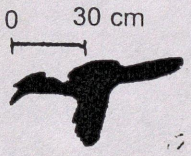
eagle

Coot

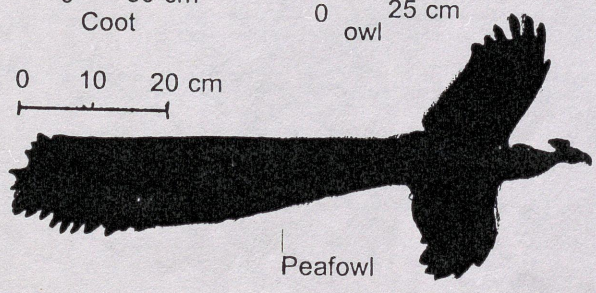
owl



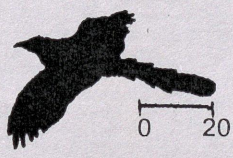
Crow Pheasant



hornbill



Peafowl



Tree Pie

Diversity: More than 9600 species of birds belonging to over 2000 genera, 187 families and 29 orders have been described from the world. Birds are divided into two superorders, the flightless birds like Ostriches and Kiwis, all of which are confined to southern continents, and the flying birds. A majority of the flying birds belong to a single order, Passerines or perching birds. Indian subcontinent harbours 1237 or over 12.5% of all bird species, although its land area is just over 2%. Birds evolved from reptiles, beginning some 150 million years ago, and are closely allied to dinosaurs. Their numbers and variety rapidly increased within last 50 million years, following the extinction of dinosaurs.

Distribution: Masters of the air, birds are found over all parts of oceans and land. The oceanic species have extremely wide distributions. Some sedentary forest dwelling species such as laughing thrushes or island species such as Narcondam Hornbill have quite restricted distributions. Many temperate zone species migrate to tropical regions in winter covering extensive distances.

Habitat preference: Birds have undergone a spectacular adaptive radiation, adapting to a tremendous variety of land, freshwater and marine habitats.

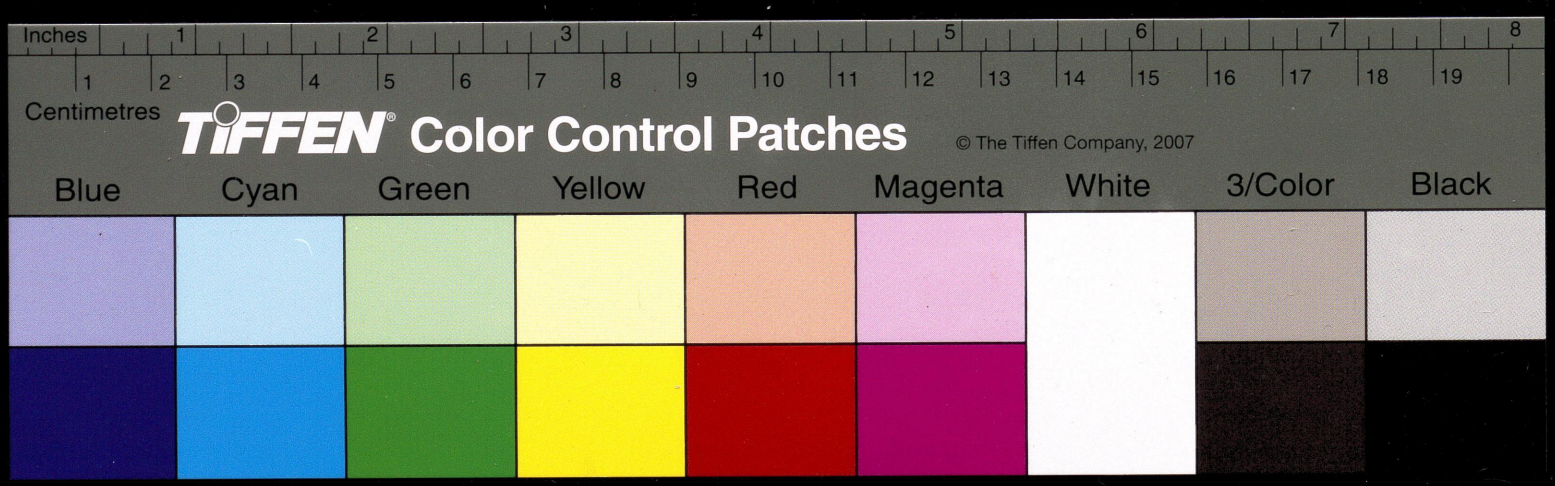
Adult behaviour: Birds range from largely solitary to highly social, but characteristically exhibit extensive courtship behaviour and care of young. Some such as crows, parakeets, and mynas gather in large groups at dusk to roost communally. Many have a large repertoire of calls, alarm calls that communicate danger are simple and often quite similar; territorial songs on the other hand are complex and highly species specific.

Food and feeding behaviour: Birds exhibit a vast range of feeding habit. The most preferred food of land birds is insects, these may be caught high up in the air on the wing as with swifts, extracted from inside the bark as by woodpeckers, or picked out of leaf litter as by babblers. But birds also eat grass, seeds and fruit, worms, snails, fish, frogs, snakes, other birds, rats, even small deer and monkeys. They scavenge on dead animals and garbage as well. The food and habitat preferences may be narrow, or broad. Tiger Bitterns, for instance, feed on freshwater animals in marshy areas amidst forest habitats; Jungle Crows feed on a wide range of plant and animal matter, as also garbage and inhabit a tremendous range of habitats.

Life cycle:

Breeding and Nesting: Most birds pair during the breeding season, construct nests in which to lay eggs and rear the chicks together. Megapodes of Nicobar are amongst the few species that allow heat of rotting leaves to incubate the eggs and display no parental care. In some species like the Peafowl, the young are able to walk and begin feeding soon after hatching; but in most species the chicks are initially helpless and require extensive feeding by parents. In cases like the Baya Weaver Bird, the males only construct nests, leaving all care of eggs and young to females; these roles are reversed in case of Pheasant tailed Jacanas. But typically, both male and female contribute to incubation of eggs and feeding of young. Birds begin breeding at the age of one to four or five years and survive for a few to twenty or so years.

Seasonal changes: Birds display marked seasonality, often with restricted breeding seasons, change in plumage from non - breeding to breeding season and local or long range movements. The most striking seasonal change is the influx of a large number of winter visitors from colder latitudes all over India. These include both land birds such as



Greenish Leaf Warbler, but more commonly water birds such as waders, teals and ducks.

Human significance: Humans have used bird eggs, meat and feathers since time immemorial; though now the hunting of wild birds has reduced, to be replaced by consumption of eggs and meat of domestic chicken (*Gallus gallus*), which was husbanded, probably in India around 5000 years ago. Birds like pigeons have been used to carry messages, or for hunting as with falcons. Many grain eating birds such as Weaver Birds and Rosy Pastors are pests of agriculture, fruit - eating birds like parakeets are pests of horticulture as well. Insectivores like drongos no doubt control insect pests. Indeed Chinese reportedly suffered severe insect damage after they exterminated House Sparrows because of their grain eating habits. Since man took to air, he has also come in conflict with birds as hazards to aircraft.

Conservation status: Over centuries humans have profoundly influenced bird life on earth, either through direct hunting, by transforming their habitats or by polluting the environment. Primitive man seems to have hunted to extinction many flightless birds of oceanic islands such as Moa and Dodo. Others such as Passenger Pigeon, incredibly abundant when Europeans first reached North America have been wiped out in more recent times. In India the Pinkheaded Duck seems to have been exterminated through conversion of forest marshes of Brahmaputra valley. Many birds of prey have suffered through pesticide accumulation. Worldwide some 11% of all species are considered to be seriously threatened.

Survey methods: Birds may be surveyed during their nesting season, either when they stake out individual territories, often quite conspicuously as with the Magpie Robin or Common Pariah Kite, or breed in colonies, as in case of Baya Weaver Birds or Cattle Egrets. Birds that roost communally in large groups may be counted at dusk or dawn at the roosts, as in case of the House Crow or Indian Myna. Birds may be censused along belt transects of a fixed length, such as 500m with a width of 50m on either side, covered over a fixed duration of time such as 60 minutes. Birds may also be censused by netting and ringing them, though this requires special apparatus and official permission.

A notable programme for assessing bird populations of India is the annual bird count on November 12 to celebrate the birthday of the well-known ornithologist, Late Dr. Salim Ali. Information on this programme may be obtained from BNHS, Mumbai.

Ecological adaptations: India is home to a rich variety bird life, with many species exhibiting notable adaptations. Our sunbird species are excellent pollinators, with slender curved bills especially suited to flowers such as the semiparasitic Loranthaceae. Species of babblers and laughing thrushes are common all over the country, except in highly urbanized habitats. They are notable for their sedentary, highly social existence with cooperative breeding. In more wooded habitats many different insect eating birds come together to form mixed hunting parties, a fascinating interspecific association. In highly urbanized habitats the ubiquitous crows persist and have taken to feeding on garbage and constructing nests out of nails and wires.

Suggested student projects:

- Bird communities of different types of habitats exhibit characteristic composition in terms of size frequencies and feeding habits. These may be explored.
- Assess the different levels of sociality in different species in any bird community

under study and interpret these differences. Explore questions like: Are smaller birds more social? Are fruit - eating birds more social?

- Assess the composition of bird community at particularly rich food sources such as fruiting Banyan or Peepal trees.
- Compare the resident bird communities in the period May - August with communities which include migratory birds between November - January. Do migratory birds prefer certain habitats such as wetland or food such as insects?

Experts and Institutions: India has a number of enthusiastic bird watches whose addresses may best be located through the Newsletter for Birdwatchers, being published from Navbharat Press, Sheshadripuram, Bangalore-20. Also involved with study of birds are the Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Mumbai - 400 023 and Salim Ali Centre for Ornithology and Natural History, Kalampalayam, Coimbatore-10.

Significant publications:

Ali S 1996 *The book of Indian birds*, (Mumbai: Oxford University Press)

Ali S and Ripley D 1983 *A pictorial guide to the birds of Indian Subcontinent* (Mumbai: Oxford University Press)

Ali S and Ripley S D 1972 *A handbook of the birds of India and Pakistan* (Bombay, London: Oxford University Press)

Grimmet R C, Inskipp and Inskipp T 1998 *Birds of the Indian Subcontinent* (London: A & C Black Publishers Ltd)

Significant repositories of specimens:

- Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Mumbai - 400 023.
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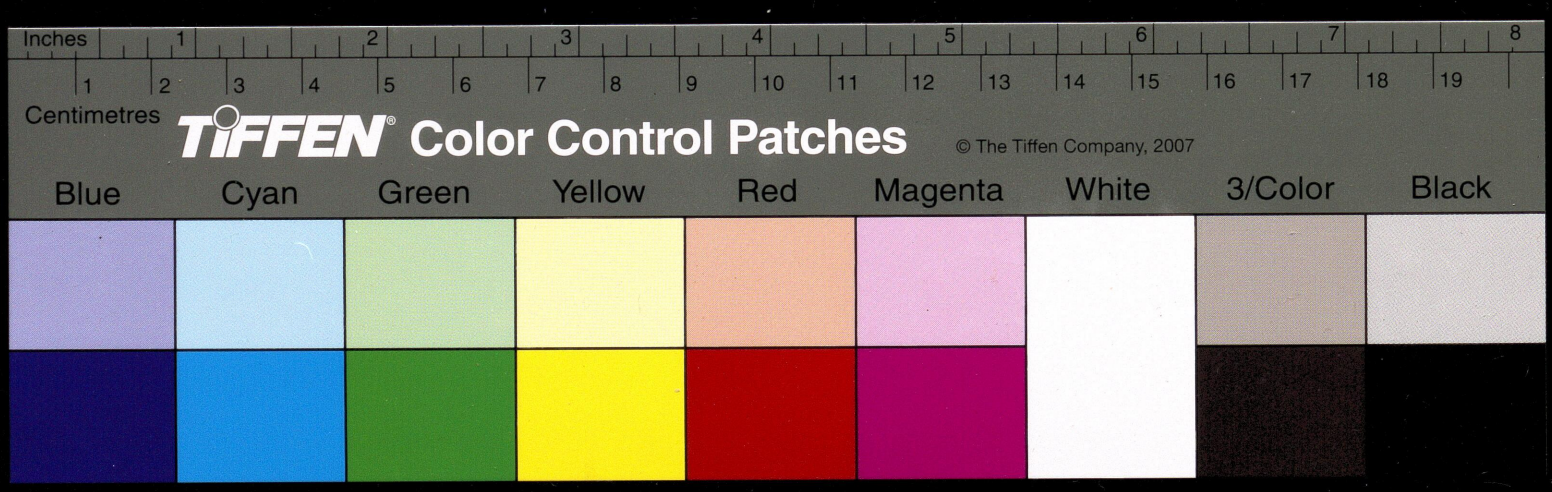
Contributed by: P. Pramod, JNCASR and Madhav Gadgil, CES, IISc and JNCASR



PERCHING BIRDS

Order: Passeriformes

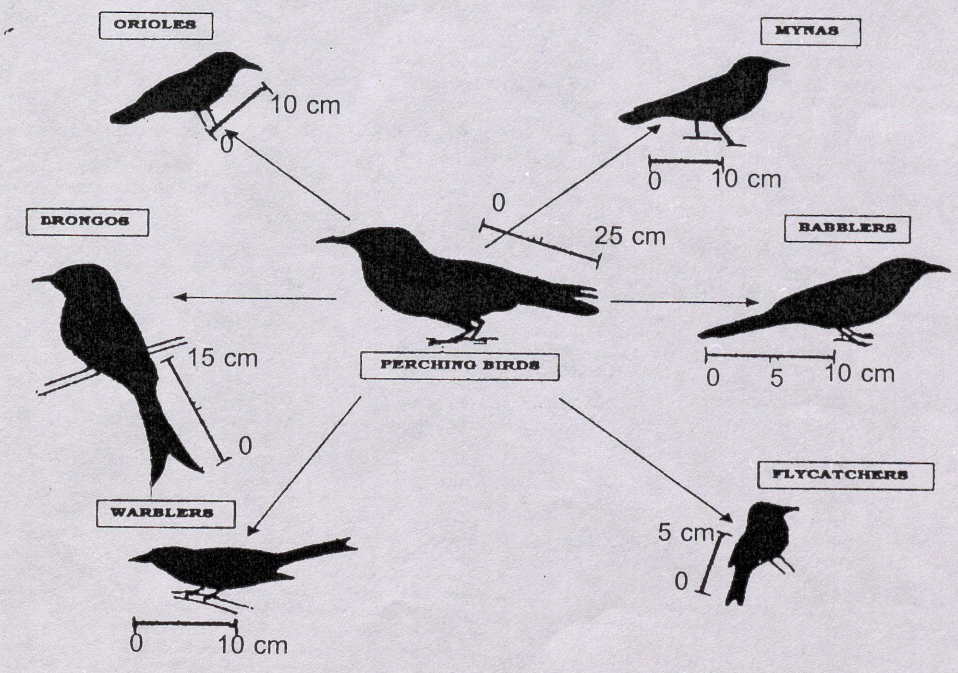
Sing a song of sixpence,
pocket full of rye,
Four and twenty blackbirds
baked in a pie,
When the pie was opened,
the birds began to sing,
Wasn't it a dainty dish,
to set before a king!

English Nursery Rhyme

Passerines are small to medium sized land birds with feet adapted to grasping a perch.

Morphological characters: Commonly called passerines, perching birds or song birds. Order Passeriformes constitute more than half the species of birds in the world today. They are small to medium sized; 7.5 cm to 117 cm in overall length. The smallest Indian passerines are flower peckers, the largest crows and ravens. Their perching feet have four, well developed, free toes. Three of them point forward, the strong hind toe guarantees a firm grip on a perch. Around the same basic

COMMON GROUPS OF PERCHING BIRDS



pattern, the toes may be modified to suit special needs such as walking on the ground, or climbing over the bark. Their bills vary widely depending on the food and feeding habits.

Diversity: Passerines include such familiar birds as crows, mynas, babblers, flycatchers, orioles and drongos, accounting for as many as 5700 of 9500 species worldwide and 652 of 1230 species of the Indian subcontinent. There is poor fossil evidence for passerines, but they are amongst the most advanced in evolutionary terms, products of the cretaceous period between 65 to 120 million years ago.

Distribution: Passerines are distributed worldwide, being more diverse in the tropics and on southern continents.

Habitat preference: Passerines are terrestrial birds, adapted to specific habitats such as evergreen or deciduous forests, crop fields or human habitation. In a particular habitat like a forest, they are further specialised to microhabitats like the canopy or the understory, foliage or tree trunks.

Adult behaviour: Passerines may be solitary like drongos or highly social like mynas or babblers. They are particularly active in early hours of the morning and around dusk, often indulging in a variety of aerial maneuvers. A little understood behaviour of passerines is anting, involving picking up worker ants and rubbing them on wings and feathers. Others squat on the ground amongst ants and allow them to move freely through the plumage, presumably to get rid of external parasites.

Sound production: Males of passerines sing a true song that serves to mark the territory and attract females. Amongst the commonest and most attractive of these is the song of the Magpie Robin which may be heard from February through May in different parts of the country. Shama is its less common, forest dwelling relative that has perhaps the most mellifluous song of all Indian birds. Hill Mynas are well known for their wide variety of calls and the ability to imitate human sounds, making them favourite cage birds.

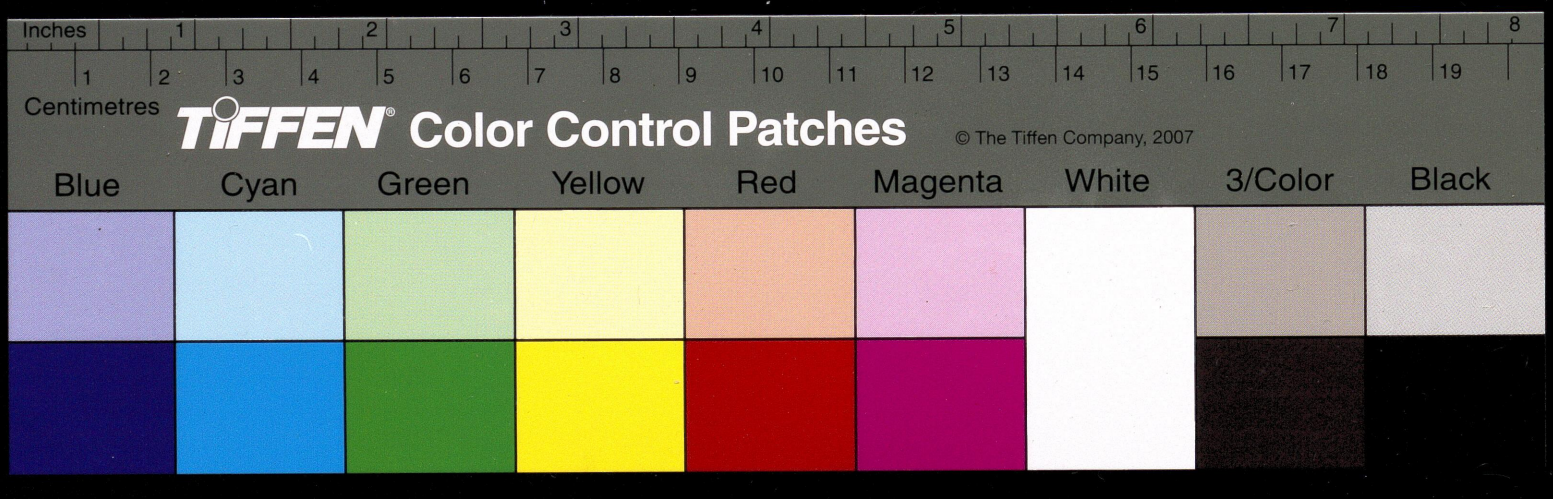
Food, feeding and foraging behaviour: Insects constitute the major prey of passerines, these may be hawked from the air, pecked off the bark, gleaned from leaves, searched for amongst leaf litter. Some passerines feed on nectar, fruit or grain.

Lifecycle:

Breeding behaviour: Insect eating passerines generally breed just before the rainy season to take advantage of the rich availability of insect larvae after the first rains. They may nest on the ground, in rock crevices, or in holes on ground and trees, and in forks of trees. The nests may be constructed of mud, grasses, cotton, feathers, barks, twigs, leaves, spider webs or metal wires. The nests vary in size, shape, architecture, ranging from loose collection of twigs to intricately woven nests of Baya Weaver Birds.

Seasonal movements: Many passerines exhibit seasonal migrations. For instance, Grey Drongo, Golden Oriole and many Leaf Warblers come to south India from Himalayas. Others like Forest Wagtails travel all the way from Eastern Asia to the Indian subcontinent.

Human significance: Passerines are important components of terrestrial food webs. They play a key role in regulating insect populations, and also serve as pollinators and seed dispersers. Some such as finches are pests of grain crops, others like drongos serve to control insect pests of agriculture. Many passerines such as munias and mynas are favourite cage birds.

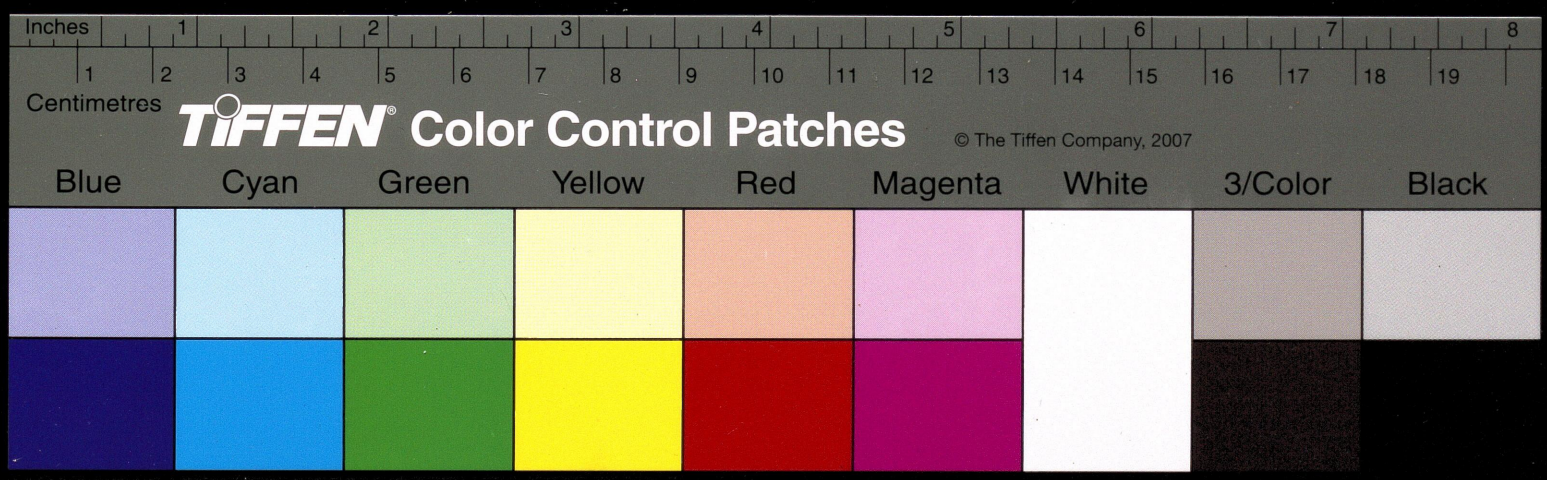


Survey methods: A belt transect of fixed dimensions, say 500 meters with 50 meters on either side, covered over a fixed time internal such as 60 minutes is the most practical method for assessment of passerine populations.

Suggested student projects:

- Assess the proportion of passerine birds, in terms of numbers of species, as well as numbers of individuals in different habitats.
- Assess the different forms of beaks, feet and toes in different passerine species in relation to their habitat and food preferences.
- Quantitatively assess the amount and variety of bird calls heard over a fixed period, say two hours at dawn and try to assess the proportion of this vocalization that may be attributed to passerines.

Contributed by: Pramod P, Evolutionary and organismal Biology Unit, JNCASR, Bangalore - 64 and Madhav Gadgil, CES, IISc, Bangalore.



DRONGOS
Dicruridae

Order: Passeriformes

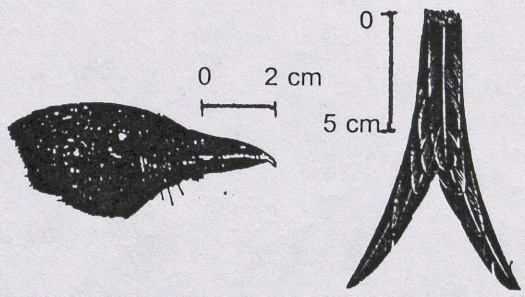
Drongos are blackish birds with long forked tails that sally after insects from prominent perches.

Morphological characters: Drongos are small to medium sized predominantly blackish birds, with shades of color ranging over glossy black to grey and slaty. Their bill is laterally compressed, strong, and covered at base by dense stout feathers. The long deeply forked tails vary in shape and structure. Eyes are generally red or black. Legs are short with strong toes and sharp curved claws. The wings are long, pointed and handsomely tapered. Drongos are very skillful at aerial maneuvers. Sexes are indistinguishable.

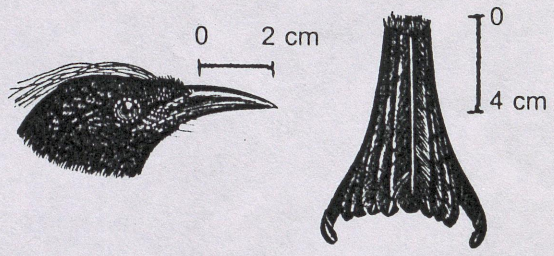
Diversity: Family Dicruridae is divided into two genera; one with a single species restricted to New Guinea. The other 19 species constitute the genus *Dicrurus*. Of these India has 10, with 13 subspecies.

Distribution: Globally drongos are distributed to the Ethiopian and Oriental region. They are distributed almost every part of the country. A few such as Crowbilled Drongo and Bronze Drongo are restricted to Himalayan region and North Eastern hill states. Ashy Drongos are found in well wooded plains and hills south to Kerala and in Narcondam Islands.

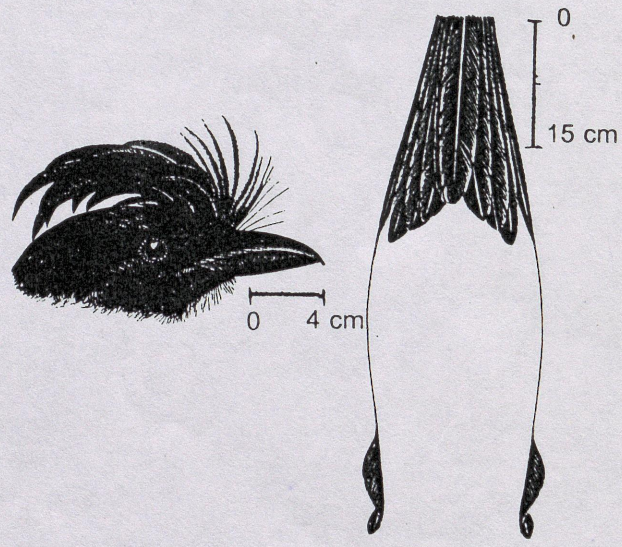
Habitat preference: Drongos are found in all habitats from open swampy rice fields to high altitude sholas, on forest edges as well as deep inside; in plains and in mountains. They are most abundant in woodlands. Their habitat preferences vary depending on the species. For example, Black Drongos prefer human habitations and the forests almost equally, whereas Bronzed Drongo is a forest bird. Crow billed Drongos live in moist and wet forests and wooded habitations. Racket tailed Drongos and Hair crested Drongos live in moist deciduous and evergreen forests while Grey Drongo prefers evergreen forests.



Head and tail of Black Drongo



Head and tail of Hair crested Drongo



Head and tail of Racket tailed Drongo

White bellied Drongo prefers semiarid and drier deciduous habitats.

Adult behaviour: Drongos are normally solitary, but are regular members of mixed flocks of insect eating birds in wet forests. They have loud, striking often metallic calls, being particularly vocal at dawn and dusk. They are great mimics of calls of other birds, even of man-made sounds. They are aggressive against predators on eggs and chicks, chasing away crows and hawks. This protection attract others like doves and orioles to nest nearby drongos.

Food and feeding behaviour: Drongos prefer to perch on a vantage point, on top of a tree in a woodland, or a bush in scrubland, or on wires in cities and towns. Flying insects are their main food and drongos sally after the prey from their perches, twisting and turning in impressive maneuvers; returning to the perch to eat the prey at leisure. Some species such as the Hair crested Drongo also feed on nectar.

Life cycle:

Nest and Nesting: Drongo nests are flat swings, small in size relative to the birds. They attach their nests to forks of small branches up to fifteen meters above the ground. Usually three or four eggs are laid.

Human significance: As major consumers of insects drongos play a significant role in control of insect pests. The Greater Racket tailed Drongo, attractive because of its metallic blue gloss and peculiar vanes at the end of the long bare tail feather shafts is often kept as a cage bird in some parts of India and Indonesia.

Survey methods: Drongos are quite common, and do not feature amongst the threatened species. But their abundance should help understand the health of the ecosystems. The best method to assess their population would be a line transect of appropriate dimensions such as 500 meters long with a fixed boundary of 50 meters on both sides.

Experts: V. S. Vijayan and Lalitha Vijayan of SACON in Coimbatore are authorities on drongos in India.

Significant publications:

Ali S 1996 *The book of Indian birds* (Mumbai: Oxford University Press)

Ali S and Ripley S D 1972 *A handbook of the birds of India and Pakistan* (Bombay, London: Oxford University Press)

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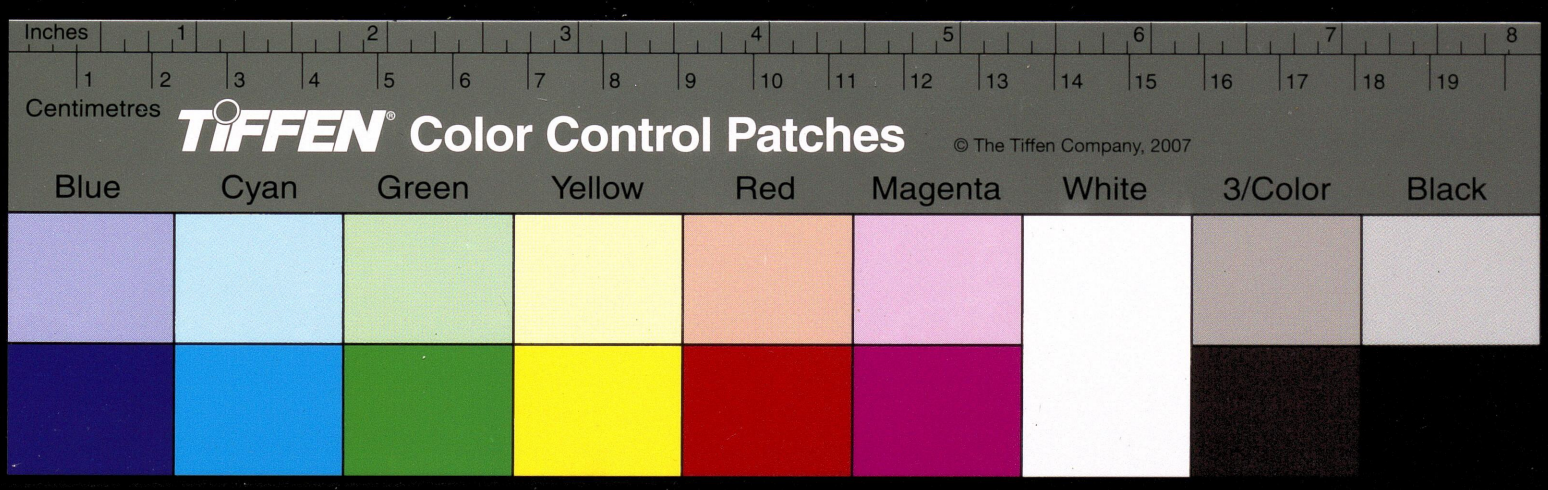
Contributed by: P Pramod, Evolutionary and organismal Unit, JNCASR, Bangalore-64



BLACK DRONGO

Dicrurus adsimilis : Dicruridae

Order: Passeriformes

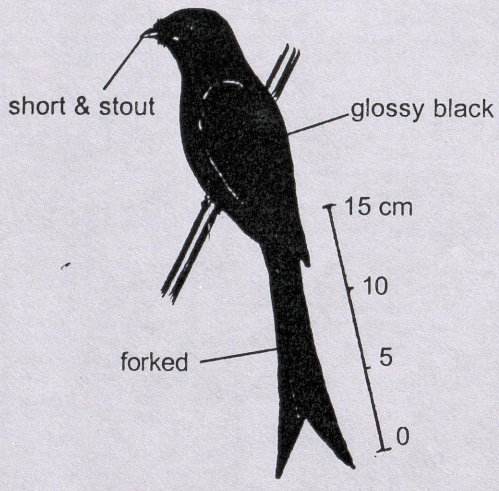
A shiny black bird is a drongo,
With a call that is louder than a bongo,
With its long forked tail,
It twists without fail,
And as to the fly, it is good bye and go !

Madhav Gadgil

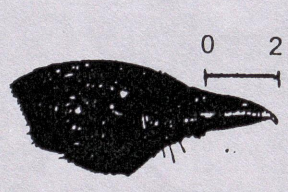
Black Drongo is a jet-black medium sized bird with a long forked tail.

Derivation: Its another common name 'King crow' refers to its ability to intimidate true crows.

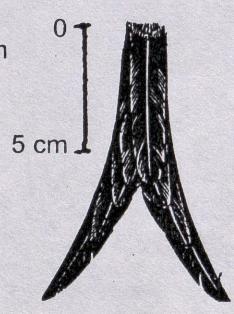
Morphological characters: In size it is slightly larger than a bulbul (length 31 cm), slim and glossy black. Beak is short and stout,



eyes are brownish black. Wings are beautifully tapered and tail is elongated and deeply forked. The most distinctive identification mark is a very small white spot just behind the base of the beak, discernible only on a close look. Sexes are alike. The juvenile differ from the adult in body plumage, wings and tail being dull and less glossy in colour and in possessing shorter wings and tail.



Head

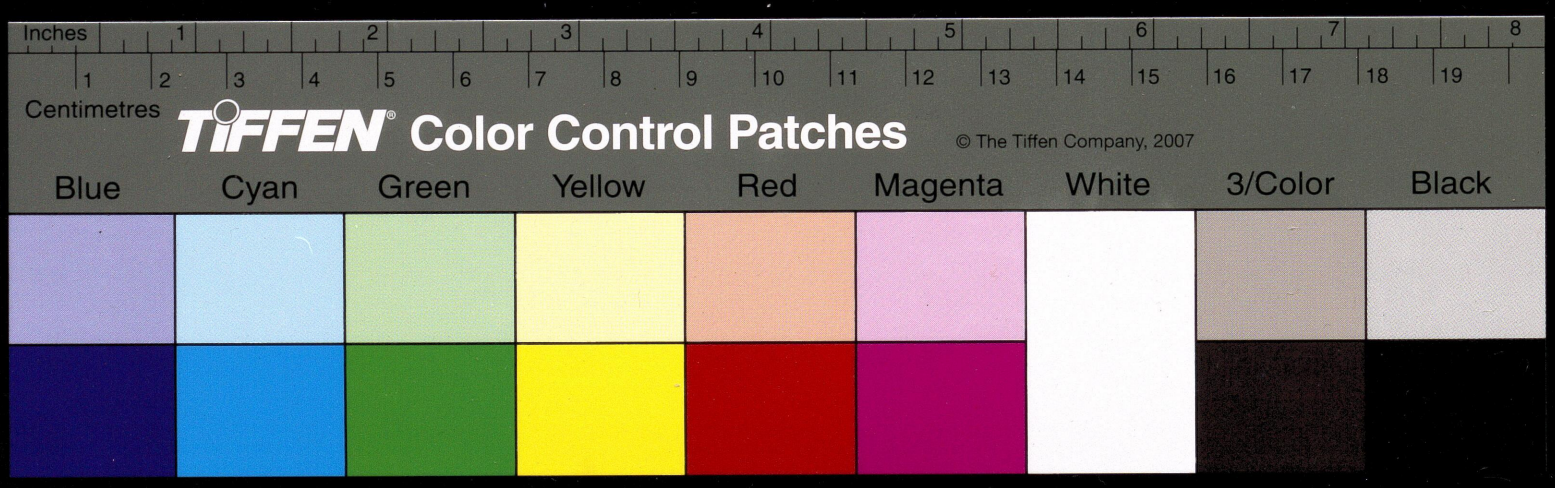


Tail

Related taxa: Grey or Ashy Drongo is similar in size and shape but for its dark grey colour and crimson red colour of the eye. Bronzed Drongo, slightly smaller with bronze colouration in the wing is also quite common in the wooded habitats. Hair crested Drongo, an exclusively forest species has a tuft of hairs on the forehead, its tail is not much forked and slightly turned backward. Another species quite common in North Eastern parts of India is Crow billed Drongo, which has a stouter and larger bill.

Distribution: Black Drongo is distributed throughout Asia and Africa i.e., Ethiopian and Oriental realms. In India, it is resident throughout the country.

Habitat preference: Black Drongo can be seen everywhere in human habitations, swampy and marshy paddy fields, other agricultural lands, thickets and forests. Of all the drongos it has a greater affinity to human habitations, being very common in villages and towns, even in cities. It generally prefers some bare branches in the tree canopy or bushes or electrical poles and wires as a perch. Telephone lines, running alongside railway lines and roads are amongst its favorite perches.



Adult behaviour: Black Drongo is a solitary, generally arboreal, very noisy and versatile bird.

Daily activity pattern: Many Black Drongos come together in the evening to roost in company. Early in the morning they disperse to their feeding territory in ones and twos. Black Drongos are amongst the earliest risers and one of the last birds to retire. Occasionally they feed on insects flocking near street lights till very late at night.

Food, feeding and foraging behaviour: Excellent insect eaters, they also feed occasionally on flower nectar and very small lizards, bats and birds. They consume large quantities of agricultural pests including many beetles, moths, crickets, locusts and bugs. Ants, termites and even the ferocious Rock bees form part of their food. They hunt for insects in open grounds perching on some elevated platform or the highest branch of available shrubs. Quite often they are seen riding the grazing cattle. From such perches they dive after the prey, returning to the perch on capturing the quarry.

Antipredatory behaviour: Black Drongos fearlessly attack larger birds like crows and raptors in defence of their eggs and chicks. They attack the intruders from below and above circling them with ferocious cries.

Sound production: Black Drongo has a normal harsh double noted call like *ti-tiu* and a harsh *cheece-cheece-chichuk*. At times, it imitates sounds of other birds and animals.

Life cycle and breeding behaviour: Black Drongos breed between April and August. Generally 3 or 4 white or creamy eggs, spotted or blotched with black or reddish brown are laid in a flimsy bottomed, cup - shaped nest of fine twigs and fibres cemented with cobwebs built in forks of trees or palms. Both the sexes participates in building the nest, incubation, defence and feeding of the chicks. Although Black Drongos keep the predators at bay, Drongo Cuckoos or Koels may succeed in parasitising the brood, removing one of the Drongo eggs.

Seasonal changes: Some seasonal, local and altitudinal migrations are reported. During summer Black Drongos ascend to more than 2000 meters and descend during winter to the plains .

Human significance: Black Drongos are excellent natural pest control agents for agricultural fields and can be especially effective if supplied with good perching sites.

Survey method: A fixed width line transect of appropriate length is a most practical method for Black Drongo population assessment.

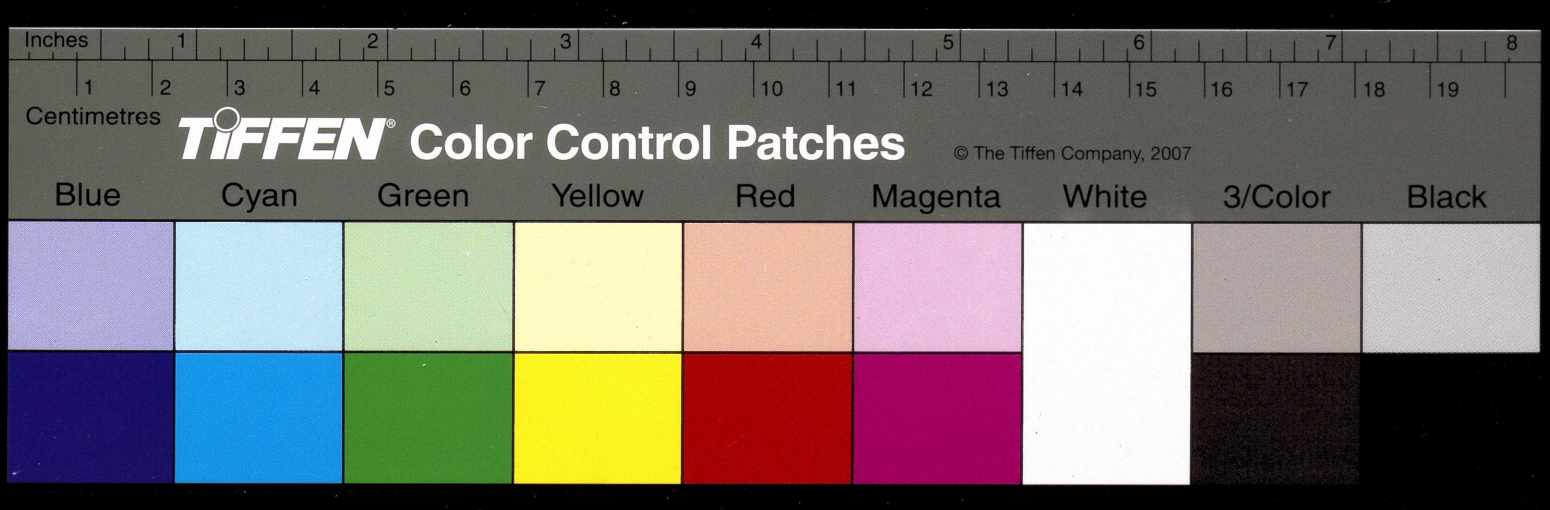
Notable interactions: Many innocuous birds like bulbuls, orioles, doves and pigeons generally build their nests in the same tree as the Black Drongo, thereby gaining protection. Black Drongo is a regular member of mixed hunting parties of insectivorous birds in forests. But, some studies suggest that Black Drongos show lower prey capturing efficiency in such mixed hunting parties due to competition.

Suggested student projects:

- Assessment of Black Drongo population in association with different kinds of crop fields over a period of time.
- Effort and insect catching efficiency of Black Drongo in a unit time in different seasons and places.
- Locating and mapping Black Drongo nesting sites in a specified region.
- Quantifying the time Black Drongos spend in different kinds of activities.

Local names:

Assamese: Phenchu; **Bengali**: Finga; **Gujarati**: Kosita, Kalokoshi; **Hindi**: Bhujanga, Kotwal, Kalkalachi, Karanjua; **Kashmiri**: Gunkots,



Telakots; **Malayalam**: Anaranchi, Kakka thampurati, Kakkarajan; **Manipuri**: Charoi; **Marathi**: Ghosia, Kotwal; **Punjabi**: Japal kalchit; **Tamil**: Kari Karuman. Karichan, Karuvattu vali, Eratai valan kuruvi; **Telugu**: Passala poli gadu.

Significant publications:

Ali S 1996 *The book of Indian birds* (Mumbai: Oxford University Press)

Ali S and Ripley S D 1972 *A handbook of the birds of India and Pakistan* (Bombay, London: Oxford University Press)

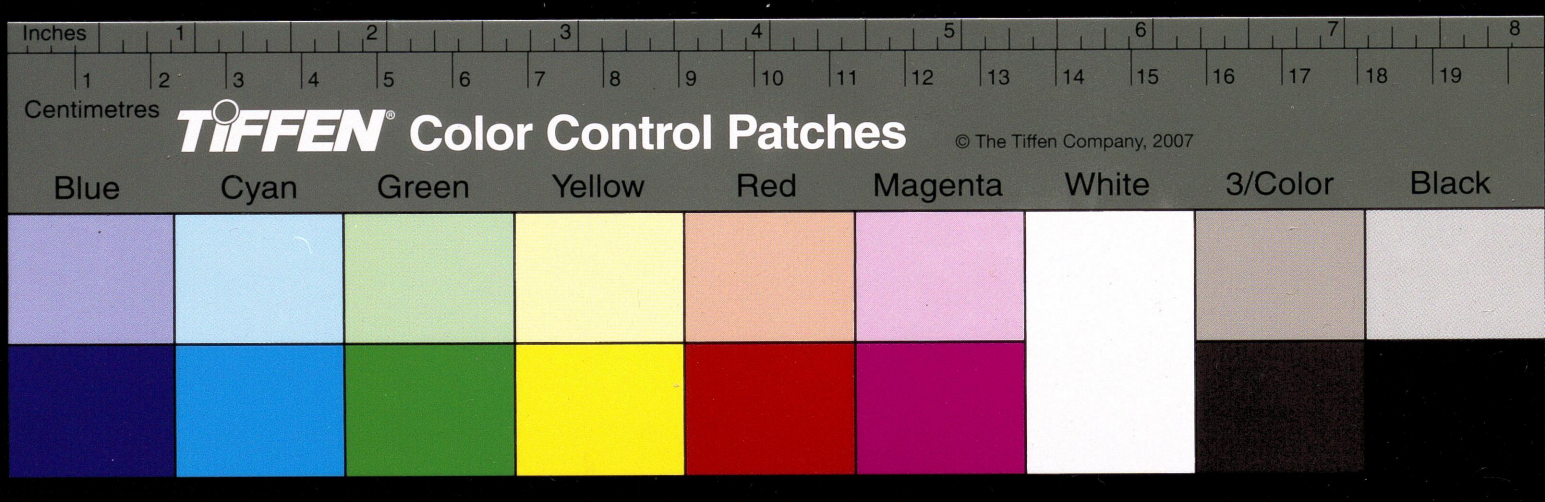
Significant repositories of specimens:

- Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Mumbai - 400 023.
- Zoological Survey of India, M - Block, New Alipore, Calcutta - 700 053.

Technical terms:

1. Arboreal
2. Ecosystem
3. Insectivorous
4. Line transect

Contributed by: Pramod P, Evolutionary and organismal Biology Unit, JNCASR, JakkurP.O. Bangalore-64.



INDIAN MYNA

Acridotheres tristis : Sturnidae

Order: Passeriformes

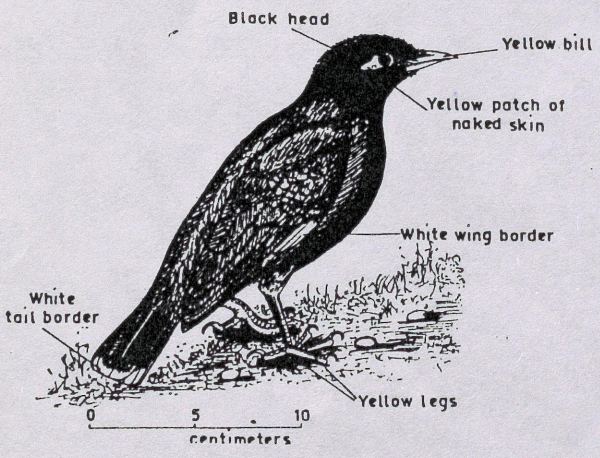
Latapata latapata tuze chalane ga
mothya nakharyacha,
Bolane ga manjul mynecha,
Nari ga, Nari ga, O Nari ga,

You have a stylish tick - tock walk,
And such sweet myna talk,
O woman!

Honaji Bala, Marathi lavani, 18th Century

A medium sized dark brown bird with yellow bill and legs in pairs or flocks, common around gardens and farms, villages and towns.

Morphological characters: With its plump body, short tail and straight, sharp bill, the Indian Myna is a characteristic feature of Indian life. In size, it is 23 cm in length, about



110 gm in weight, a little smaller than a dove, bigger than a bulbul. It is dark brown in colour with a glossy black head and bright yellow legs, bill and a naked patch below and behind eye. When in flight a white bar opens out on the wing; its tail is also bordered with white. Males and females are indistinguishable, the young ones are little dull in colour with the heads ashy brown rather than black.

Related taxa: Indian Myna most resembles the Jungle Myna (*Acridotheres fuscus*) which lacks the yellow patch of skin behind the eye, is greyer in colour and has a little tuft of black feathers at the base of its bill on the forehead. The Bank Myna (*Acridotheres ginginianus*) is slightly smaller and pale bluish grey in colour, with a brick red patch of naked skin below and behind the eye. Pied Myna is a black and white bird with deep orange and yellow bill. Hill Myna is a glossy black bird with sulphur yellow bill, legs and bright yellow naked skin and wattles.

Distribution: Indian Mynas are resident, staying in a given locality year after year, probably coming to the same communal roost evening after evening. They occur throughout the subcontinent including Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka,

going upto 3000 m in Himalayas. They have also been introduced to Andaman, Nicobars and Lakshadweep; as well as other parts of the world such as New Zealand.

Habitat preference: Indian Myna follows people everywhere in the country, quick to colonize even far out in the desert. It is to be seen in town and villages, fields and gardens, sometimes walking after cattle, other times hunting insects on its own. It has a direct, business like flight in the air and a parade step on the ground.

Adult behaviour: Mynas go in pairs or small parties, chattering a great deal. They sleep in large aggregations at communal roosts in large leafy trees, coconut groves, sugarcane fields, or in warehouses or railway stations. Such communal roosts are often mixed with those of crows, sparrows, parakeets or rosy pastors.

Food and feeding behaviour: Indian Mynas have a broad range of diet, chiefly fruit, grain, insect and grubs but also small animals like baby mice, lizards and crabs and kitchen scraps form garbage dumps. They are also fond of nectar from bird flowers like Silk Cotton.

Life cycle:

Breeding behaviour: The breeding season is primarily between April to July, but may commence as early as mid-January in Kerala and extend to September in parts of the country. Mynas nest in holes in trees or in walls and roofs of buildings. Usually there is considerable competition for nesting sites with violent fights between members of prospective pairs. Each partner grapples with its opposite number in a noisy rough and tumble, often dropping to ground. Mynas generally raise two successive broods over the breeding season laying clutches of four or five blue eggs.

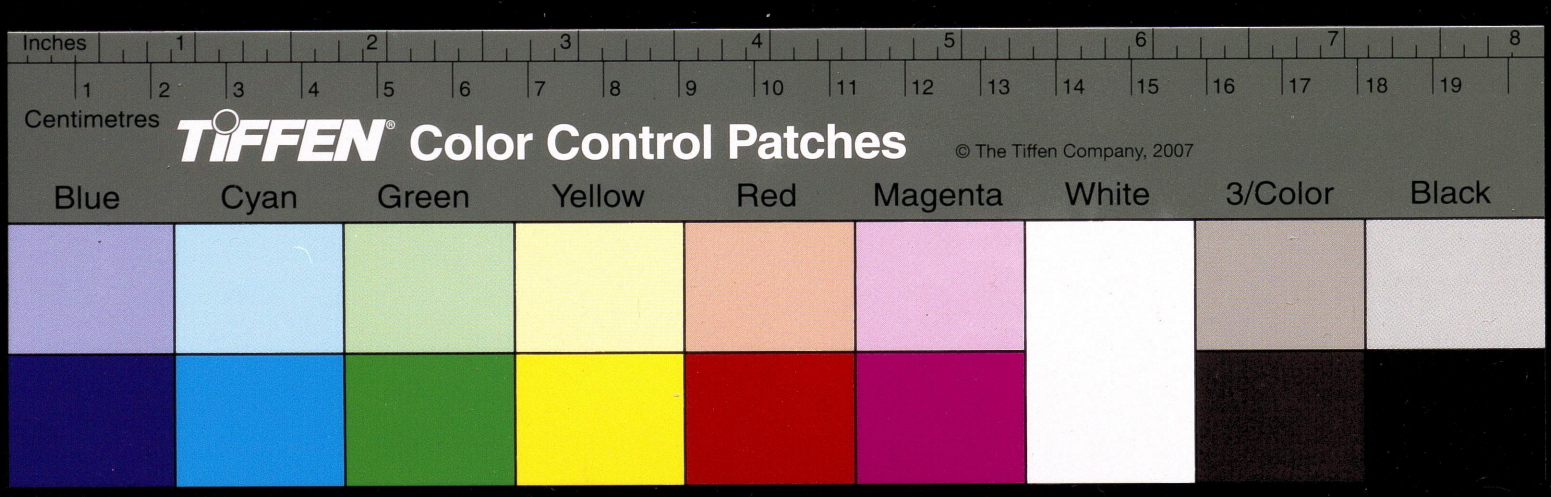
Human significance: Indian Mynas are a companion of man all over the country amusing people with their chirpy chatter. To an extent they damage crops and orchards, but also help by destroying insects.

Survey methods: Indian Mynas are quite conspicuous and may be easily recorded on bird counts along standardized belt transects. Their large noisy communal roosts with several hundred to thousands of birds may also be located and mapped, and birds counted fairly accurately as they gather at the roosts just before the sunset in the evenings. It is also possible to locate their nests and estimate their breeding populations in a given area.

Suggested student projects:

- Mapping of communal roosts of mynas, crows, parakeets and population censuses.
- Role of mynas in pollination of trees like Silk Cotton and coral trees.
- Role of mynas as pests of crops like jowar.
- Biological clock of mynas in terms of time at which they leave the roosts in the morning and return to them in the evening.
- Nesting success of mynas.
- Variety of calls used by mynas in different situations.

Local names: **Assamese**: Salik sorai, Salika, Ghor salika; **Bengali**: Shalik, Bhat shalik; **Cachari**: Dao myna; **Chota Nagpur**: Bemni, Saloo; **Gujarati**: Kabar; **Hindi**: Desi myna; **Kannada**: Gorwantera; **Kashmiri**: Hor; **Madhya Pradesh**: Gulgul; **Malayalam**: Kaavalamkili, Maadatha, Kaarman, Kaarma, Chithirakkili, Chanakakkili, Naathumyna, Unniethi; **Marathi**: Shale, Salonki; **Tamil**: Nahanavai; **Telugu**: Goranka.



Significant publications:

Ali S 1996 *The book of Indian birds* (Mumbai: Oxford University Press)

Ali S and Ripley S D 1972 *A handbook of the birds of India and Pakistan* (Bombay, London: Oxford University Press)

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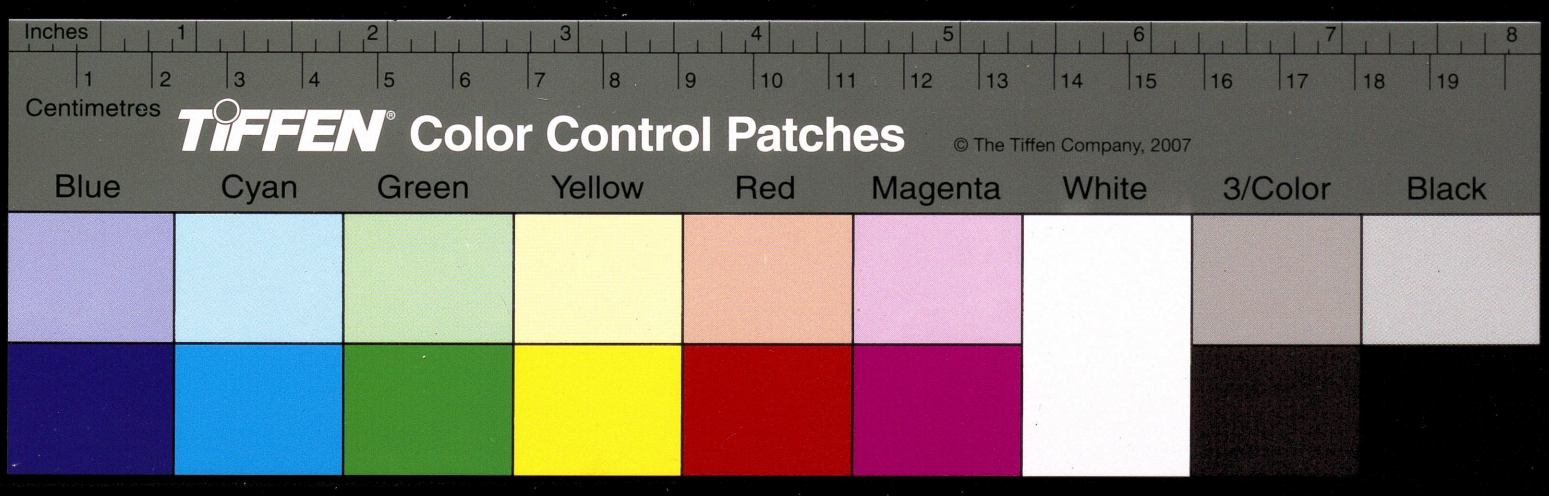
Contributed by: Madhav Gadgil, CES, IISc, Bangalore.



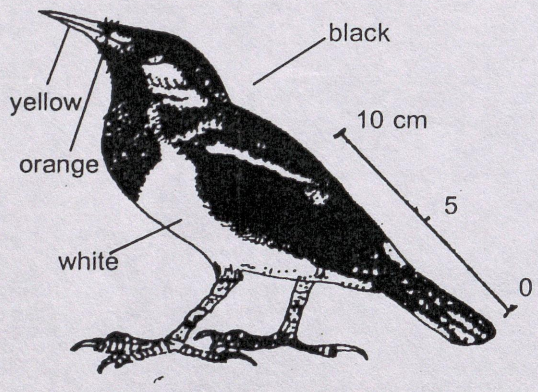
PIED MYNA

Sturnus contra : Sturnidae

Order: Passeriformes

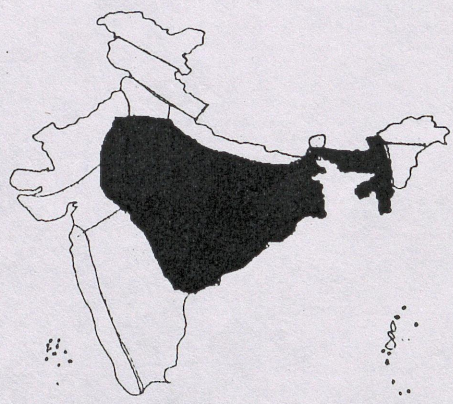
Pied Myna is a black and white, highly sociable, medium sized land bird.

Morphological characters: Pied Myna is a typical myna, with a plump body, short tail and a straight, sharp bill. In size it is 23 cm in length, between a dove and a bulbul. It is a trim black and white bird with conspicuous deep orange - red skin around its eyes and a bright orange and yellow bill. Sexes are alike. The young are much paler, with the breast streaked or smeared with brown.



Related taxa: Pied Myna is pretty much the same size and appearance as the Indian Myna (*Acridotheres tristis*) and the Jungle Myna (*Acridotheres fuscus*), but clearly distinguishable by its bright black and white colours, the orange patch of skin around the eye and the orangish bill.

Distribution: Pied Mynas are resident birds, but probably undertake some seasonal local movements about which little is known. Their distribution covers northern and eastern continental India, east of a line from about 76°E longitude (Ludhiana and Hissar), south through eastern Rajasthan roughly to Hoshangabad (M.P.), Hyderabad (A.P.) and the Krishna river delta (about 16°N lat). To the north it extends upto U.P. and Nepal terais through Assam and Bangladesh. There is an isolated population near Mumbai in Maharashtra. It is primarily a bird of plains going upto 700 m in foothills.



Distribution

Habitat preference: Pied Myna affects open cultivated well-watered country around human habitations, damp grazing lands, tank margins, sewage farms, city garbage dumps.

Adult behaviour: A highly sociable bird in small parties or flocks of upto 30 birds except when paired for breeding. Roosts communally on trees, often in association with other species of mynas. They make a variety of high-pitched but pleasant musical calls.

Food and feeding behaviour: Garbage dumps, cattle pens and marshy grazing lands are favourite feeding grounds of the Pied Myna, which often ride on backs of cattle. Their food includes insects (cockroaches, bugs, grasshoppers, beetles, termites, bees), earthworms, molluscs, and certain nematodes, also fruit and cereal grain.

Life cycle:

Breeding behaviour: The breeding season lasts from March to September, often involving raising of two successive broods. Pied Mynas place their nests amongst tree branches or on electric poles, five to ten meters off the ground. Each clutch includes four or six glossy blue eggs.

Human significance: Pied Mynas are companions of man wherever they occur, entertaining people with their musical chatter. They cause minor damage to crops, but also help in controlling insects.

Survey methods: Pied Mynas may easily be recorded along belt transects, or censused at their communal roosts.

Suggested student projects:

- Mapping of communal roosts of Pied Mynas, and their association with other species at the roosting sites.
- Formation of mixed flocks with other species during daytime.
- Nesting sites, use of a variety of nesting materials, nesting success.

Significanct publications:

Ali S 1996 *The book of Indian birds* (Mumbai: Oxford University Press)

Ali S and Ripley S D 1972 *A handbook of the birds of India and Pakistan* (Bombay, London: Oxford University Press)

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Contributed by: Madhav Gadgil, CES, IISc, Bangalore.

Format For Writing Lifescape Accounts

1. Common English name

2. Scientific name along with taxonomic category as appropriate (series, order, family, species).

3. An interesting verse or poem available or specially composed, preferably from Indian sources including Ayurvedic texts.

4. Succinct statement of what the plant or animal is (a large, deciduous tree, notable for its fissured bark; a small yellow coloured butterfly with black borders; a medium sized red ant that weaves a series of nests out of leaves).

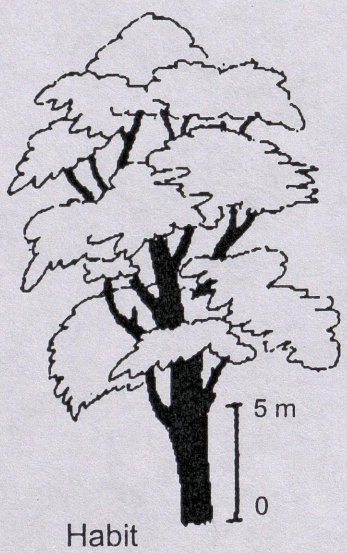
5. Interesting facts, popular beliefs, folklore and myths

   (In Maharashtra, the call of the Brainfever Bird (*Cuculus varius*) is interpreted as 'Perte Va' - or go ahead and sow - an invocation to the farmers).

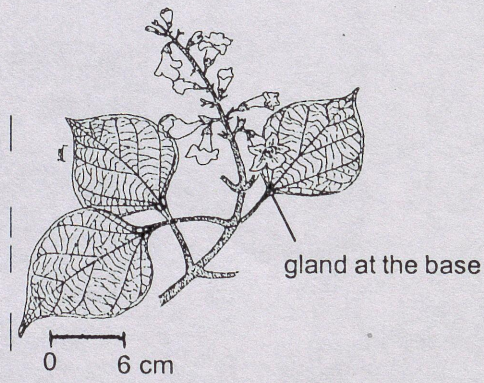
6. Derivation of the scientific and popular names, if interesting. (family Nepenthes derives its name from greek meaning without care, in allusion to the statement in the Odyssey where Helen so drugged the wine-cup that its contents freed men from grief and care).

7. History of the taxon: Time of introduction and its spread, if exotic; time course of shrinkage of its range, if now rare.

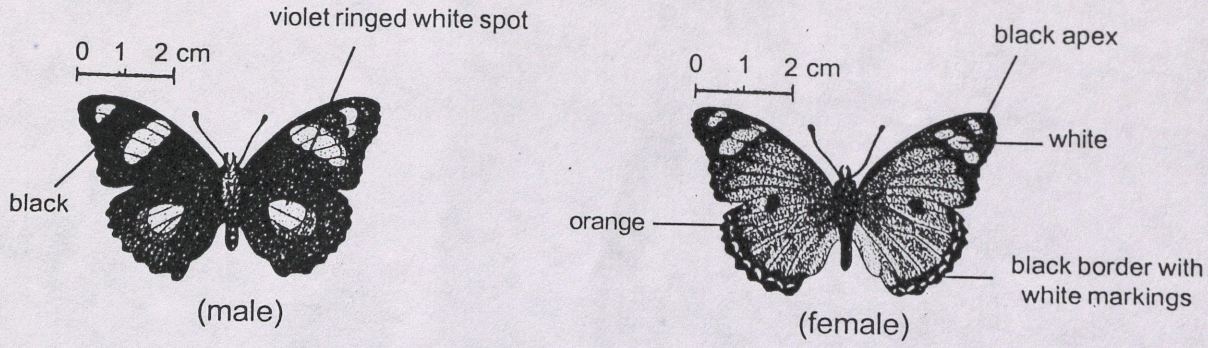
8. Morphological characters useful for field identification. Size, growth form, seasonal forms, sexual dimorphisms (male and female Danaid Eggfly are very different in colouration). [Provide sketches with arrows pointing to diagnostic characters. As far as possible such sketches should be accompanied by a scale indicating size].



Habit

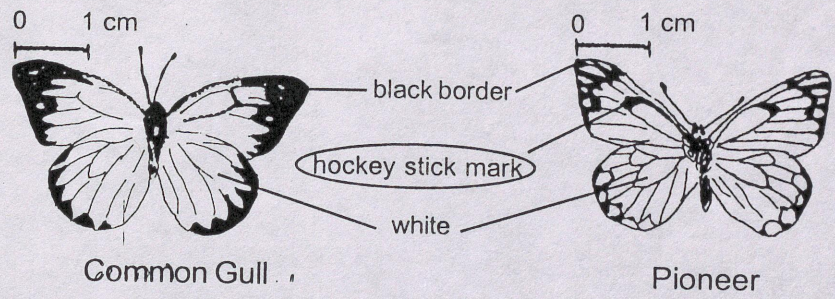


Twig



Danaid Eggfly (Sexual dimorphism)

9. Related taxa with which appearance may be confused (the Pioneer Butterfly resembles Common Gull in colouration and size but the latter can be distinguished by the absence of hockey stick mark on the upper forewing; Black Drongo and Ashy Drongo are quite similar looking species. They can be distinguished by the colour of their eyes. Black Drongo has brownish black eyes whereas those of Ashy Drongo are red). [Provide sketches highlighting their distinguishing characters].

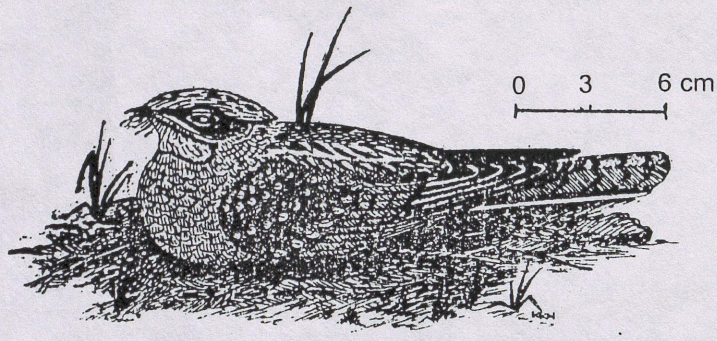


10. Levels of diversity within the taxon at global and Indian level (family Nymphalidae is estimated to have some 6000 species, comprising more than 100 genera of which around 521 species of 50 genera are found in India); any interesting aspect of evolutionary history, especially in case of higher taxonomic categories.

11. Distribution:
    a. Global in 6 biogeographic zones [Oriental, Australian, Palearctic, Ethiopian, Nearctic, Neotropical]. **Refer Appendix I**
    b. Indian in 10 biogeographic provinces [as per Rodgers and Panwar] **Refer Appendix II**
    c. In terms of bioclimate. **Refer Appendix III**
    d. In terms of temperature and altitudinal zone . **Refer Appendix IV**
    e. In terms of specific locality, if the distribution is rather restricted *(Cycas beddomei* is restricted to Chittoor district of Andhra Pradesh).

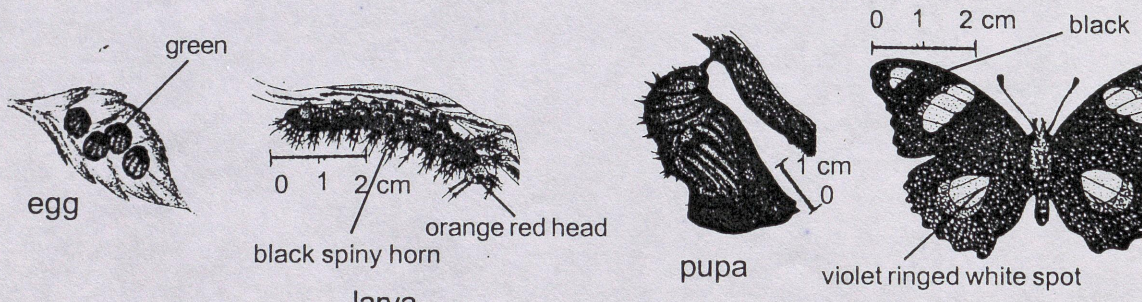
12. Habitat preference: **Refer Appendix V**
    a. Macrohabitat (marine, estuarine, freshwater – stagnant and flowing, terrestrial habitats)
    b. Microhabitat [Stratum of vegetation or water column occupied].
    c. Habitat specialization (bird perches on treetop or poles, scurries around leaf litter on forest floor; ants nest under boulders and forage along ground etc).

13. Adult Behaviour: [Provide sketches wherever applicable].
    a. Solitary/social, group size, social organization (insects such as ants, termites, bees, wasps exhibit social behaviour; some birds such as Jungle Babbler are always found in groups).
    b. Daily activity pattern (most birds are active in the early hours or around sunset, most of the butterflies are active after 10 a.m. when the sun is hot).
    c. Flight pattern
    d. Sound production (Tailor Bird has a loud 'towit towit towit' or 'pretty pretty pretty' call).
    e. Food, feeding behaviour.
    f. Predators, parasites, anti-predatory behaviour, camouflage, poison (many butterflies are poisonous to birds), sting, mimicry, alarm calls, mobbing.



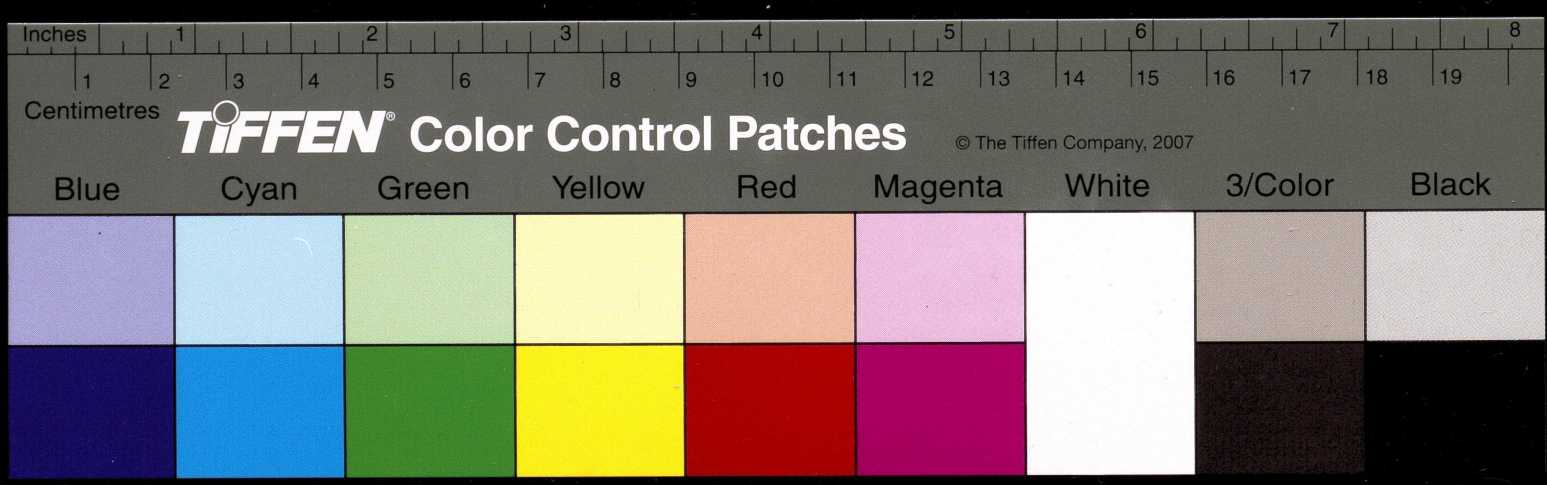
Nightjar - Camouflage

14. Life cycle and breeding behaviour (many fishes and birds show dramatic changes in colouration during breeding season); territoriality (the song of male Magpie Robin is an indication to other Magpie Robins about its territory), nest and nesting, nesting site (ground, tree holes, houses poles), parental care, courtship behaviour. Immature stages such as egg, larva, pupa, etc. (size, shape, colouration, duration, feeding habits, habitat, nesting site, pupating site, protective behaviour such as camouflage, mimicry). [Provide sketches of their immature stages].



Life cycle - Danaid Eggfly

15. Seasonal changes: Aestivation, hibernation, diapause, long range movements, migration, (fishes perform breeding migration and feeding migration), timing of significant phenological events (leaf shedding, flowering, fruiting), seasonal changes in abundance, (herbaceous



plants like *Curculigo orchiodes* flower with first rains by using nutrients stored in underground storage organs, have active above ground vegetative growth during early monsoon and then die out; adult fireflies are abundant during early weeks of monsoon; adult dragonflies are abundant in early post-monsoon season).

16. Long term fluctuations: (*Strobilanthes kunthianus* flowers only once in 12 year; populations of the bamboo Bambusa arundinacea flower gregariously after about 45 years of vegetative growth; the young ones of Cicada *(Magicicada septendacium)* need 17 years to complete their development).

17. Human significance: Source of food, medicine, timber, other economic products, religious feelings, source of harm as weeds, vector of diseases, pests.

18. Extent of range and levels of population abundance, sources of change in range and population levels such as habitat destruction (Destruction of special habitat like myristica swamps are the root cause for the rarity of species such as *Myristica fatua var. magnifica* and *Gymnacranthera canarica*), poisoning by persistent pesticides (populations of shrikes have dwindled in recent years, presumably because of accumulation of pesticides at higher levels in the food chain), harvests (*Taxus buccata* and musk deer have declined due to overharvests.

19. Conservation status: Status of regeneration, listing in red data books, any legal protection such as listing in Wildlife Protection Acts or CITES, ongoing attempts at conservation, propagation or eradication. [State source of information].

20. Succinct statement of ecological survey methods appropriate to population assessment of the concerned taxon (one of the best methods for bird survey is a line transect of 500 m and 20 m on either side).

21. Notable ecological adaptations which may provide suitable themes for special student projects like indicator organisms, successional status, ecological role and significance, relevance to ecosystem services and any other special features. Notable interactions such as pollination, seed dispersal, parasitism, commensalism, symbiotic relationship which cannot be included in the behaviour section can also be included here.

22. Suggested student projects: Any special adaptation or behaviour that merits study. Major gaps in available information on the taxon that merit investigations.

23. Local names in as many Indian languages and dialects as possible.

24. Experts, centers of important research on the taxon (Dr. K. Gopalakrishna Bhat, Head. Dept. of Botany, Poornaprajna College, Udupi is an expert on Zingiberaceae, Cyperaceae and Eriocaulaceae).

25. Significant publications on the taxon [These may be provided alphabetically in a standard form as in the *Journal of Biosciences*, Indian Academy of Sciences, Bangalore]

Srivastava P K 1993 Pollination mechanisms in the genus *Terminalia* Linn; *Indian Forester* **119**: 147-150

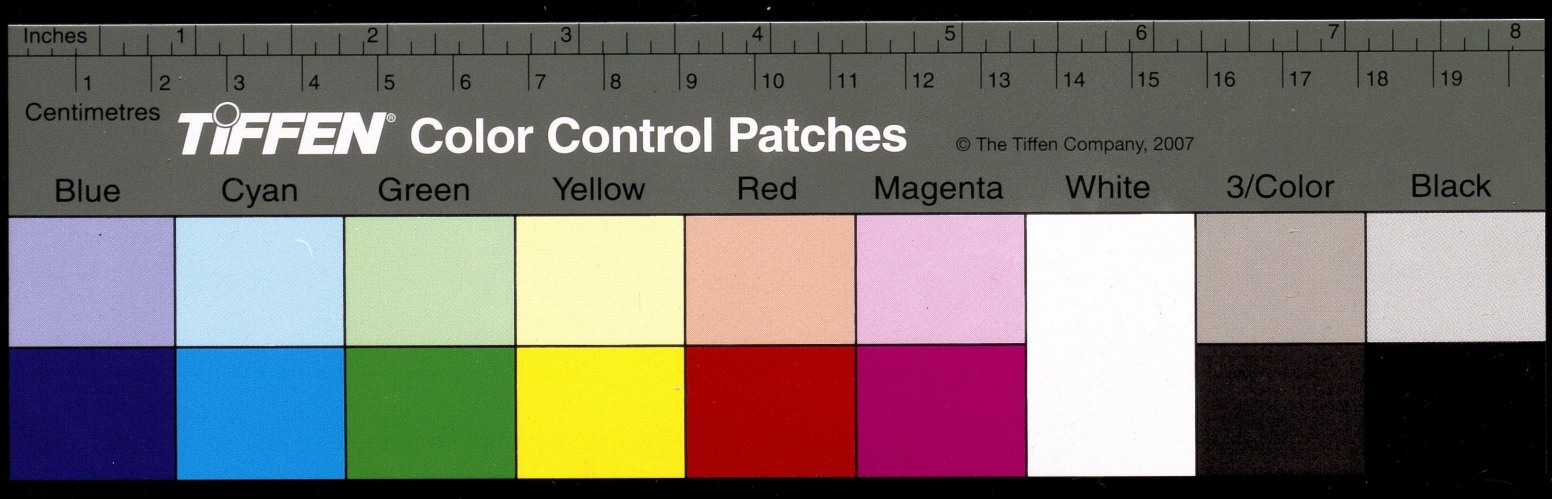
Wynter-Blyth M A 1957 *Butterflies of the Indian region* (Bombay: Bombay Natural History Society)

Gunathilagaraj K 1998 *The field guide on "Some South Indian butterflies"* (Ootachamund: Nilgiiri Wildlife and Environmental Association)

26. Significant repositories of live as well as dead specimens of the taxon (Botanical Survey of India, Botanical gardens in different regions; Bombay Natural History Society, Mumbai). [Provide complete address]

27. List of technical terms used in the account, arranged alphabetically.

28. Names and addresses of contributors – writing, illustration, reviewing, revision and rewriting.



APPENDIX-VI

Target Taxa at a glance with their Selection Criteria

Criteria \ Taxonomic Group	Plants	Animals
Conservation	Trees - 94 species Orchids & Epiphytes - 44	Mammals - 40, Birds - 195, Reptiles 34, Amphibians - 15, Butterflies - 71
Potential genetic resources	Trees - 18, Shrubs - 22, Herbs - 43, Climbers -25, Bamboos & Rattans - 18	
Ecosystem service		Wasps (pollinators) - 31, Spiders (predators) - 15
Keystone resources	Ficus - 16	
Sustainable use	Medicinal plants - 252	Freshwater fishes - 65
Ecologically sound methods of control	Weeds - 43	Pests of Paddy - 21, Pests of Arecanut - 11, Diseases of Paddy - 10, Diseases of Arecanut & Coconut - 22, Vectors of Human and Livestock diseases - 15
Indicators of soil quality	Mushrooms - 20 genera	Earthworms - 16 genera
Indicators of water quality	Aquatic plants - 23	Aquatic macroinvertebrates:- Aquatic insects - 86 families, Freshwater molluscs - 14 families and 30 genera
Indicators of air quality	Lichens - 3 groups (Group level)	
Evolutionary lineages		Ants - 30 genera

APPENDIX VIII

Animal Target Taxa

Sl.N	*Scientific Name*	Sl. No	*Scientific Name*	Sl N	*Scientific Name*	Sl.N	*Scientific Name*
Fresh water fishes							
1	*Ambassis commersoni*	18	*Ctenopharyngodon idella*	35	*Labeo angra*	52	*Pangasius pangasius*
2	*Anabas testudineus*	19	*Cyprinus carpio*	36	*Labeo calbasu*	53	*Pseudambassis ranga*
3	*Anguilla bengalensis*	20	*Danio aequipinnatus*	37	*Labeo rohita*	54	*Puntius carnaticus*
4	*Anodontostoma chacunda*	21	*Esomus danricus*	38	*Lates calcarifer*	55	*Puntius fasciatus*
5	*Aorichthys seenghala*	22	*Etroplus maculatus*	39	*Lepidocephalus thermalis*	56	*Puntius filamentosus*
6	*Aplocheilus panchax*	23	*Etroplus suratensis*	40	*Macropodus cupanus*	57	*Puntius jerdoni*
7	*Barilius bakeri*	24	*Eutropiichthys vacha*	41	*Mastacembelus armatus*	58	*Puntius sarana*
8	*Barilius bendelisis*	25	*Gambusia affinis*	42	*Mystus cavasius*	59	*Puntius ticto*
9	*Barilius gatensis*	26	*Garra gotyla stenorhynchus*	43	*Mystus gulio*	60	*Rita rita*
10	*Catla catla*	27	*Glossogobius giuris*	44	*Mystus vittatus*	61	*Setipinna phasa*
11	*Channa marulius*	28	*Goniolosa manmina*	45	*Nandus nandus*	62	*Tor khudree*
12	*Channa orientalis*	29	*Gonoproktopterus dubius*	46	*Nemacheilus denisonii*	63	*Tor putitora*
13	*Channa striatus*	30	*Gonoproktopterus kolus*	47	*Nematolosa nasus*	64	*Tor tor*
14	*Cirrhinus cirrhosus*	31	*Gudusia chapra*	48	*Neolissochilus hexagonolepis*	65	*Wallago attu*
15	*Cirrhinus mrigala*	32	*Heteropneustes fossilis*	49	*Ompok bimaculatus*		
16	*Cirrhinus reba*	33	*Hilsa ilisha*	50	*Oreochromis mossambica*		
17	*Clarius batrachus*	34	*Hyporhamphus limbatus*	51	*Osphronemus goramy*		

Ambphibians

Sl No:	*Scientific Name*	Common Name	Sl No:	*Scientific Name*	Common Name
66	*Ichthyophis sp.*	Caecilians	74	*Rana hexadactyla*	Indian Pond Frog
67	*Bufo stomaticus*	Marbled Toad	75	*Rana cyanophlyctis*	Skipper Frog
68	*Bufo melanosticus*	Common Toad	76	*Rana tigerina*	Indian Bull Frog
69	*Bufo microtympanum*	Southern Hill Toad	77	*Rana limnocharis*	Indian Cricket Frog
70	*Microhyla ornata*	Ornate Microhyla	78	*Rana malabarica*	Fungoid Frog
71	*Uperodon globulosum*	Balloon Frog	79	*Polypedates maculatus*	Indian Tree Frog
72	*Uperodon systoma*	Marbled Balloon Frog	80	*Rhacophorus malabaricus*	Malabar Gliding Frog
73	*Kaloula pulchra*	Ceylon Pulchara			

Reptiles

81	*Bungarus fasciatus*	Banded Krait	86	*Ramphotyphlops braminus*	Common Blind Snake
82	*Hemidactylus leschenaulti*	Bark Gecko	87	*Calotes versicolor*	Common Garden Lizard
83	*Hemidactylus brooki*	Brook's Gecko	88	*Ahaetulla nasutus*	Common Green Whip Snake
84	*Amphiesma stolata*	Buffstriped Keelback	89	*Dendrelaphis tristis*	Common Indian Bronze Back
85	*Xenochrophis piscator*	Checkered Keelback	90	*Bungarus caeruleus*	Common Indian Krait

91 *Varanus bengalensis*	Common Indian Monitor	103 *Crocodylus palustris*	Mugger
92 *Ptays mucosus*	Common Rat Snake	104 *Uropeltis ocellatus*	Ocellate Shield Tail
93 *Mabuya carinata*	Common Skink	105 *Atretium schistosum*	Olive keelback
94 *Lycodon aulicus*	Common Wolf Snake	106 *Psammophilus dorsalis*	Penninsular Rock Agama
95 *Aspideretes leithi*	Deccan Soft Shell	107 *Trimeresurus malabaricus*	Pit Viper
96 *Draco dussumieri*	Draco	108 *Eryx conicus*	Russell's Earth Boa
97 *Calotes rouxi*	Forest Calotes	109 *Vipera russelli*	Russell's Viper
98 *Chamaeleon zeylanicus*	Indian Chameleon	110 *Echis carinatus*	Sawscaled Viper
99 *Naja naja*	Indian Cobra	111 *Riopa punctata*	Snake Skink
100 *Lissemys punctata*	Indian Flap Shell Turtle	112 *Hemidactylus frenatus*	Southern House Gecko
101 *Melanochelys trijuga*	Indian Pond Terrapin	113 *Geochelone elegans*	Starred Tortoise
102 *Python molurus*	Indian Python	114 *Geochelone travancorica*	Travancore Tortoise

Birds

115 *Apus melba*	Alpine Swift	144 *Sarkidiornis melanotos*	Comb Duck or Nakta
116 *Artamus fuscus*	Ashy Swallow Shrike	145 *Turdoides caudatus*	Common Babbler
117 *Prinia socialis*	Ashy Wren Warbler	146 *Treron phoenicoptera*	Common Green Pigeon
118 *Hypsipetes madagascariensis*	Black Bulbul	147 *Tockus birostris*	Common Grey Hornbill
119 *Dicrurus adsimilis*	Black Drongo or King Crow	148 *Cuculus varius*	Common Hawk Cuckoo
120 *Ictinaetus malayensis*	Black Eagle	149 *Carpodacus erythrinus*	Common Rose Finch
121 *Marcogyps calvus*	Black or King Vulture	150 *Tringa hypoleucos*	Common Sandpiper
122 *Coturnix coromandelica*	Blackbreasted or Rain Quail	151 *Tephrodornis pondicerianus*	Common Wood Shrike
123 *Coracina melanoptera*	Blackheaded Cuckoo Shrike	152 *Fulica atra*	Coot
124 *Larus ridibundus*	Blackheaded Gull	153 *Nettapus coromandelianus*	Cotton Teal
125 *Oriolus xanthornus*	Blackheaded Oriole	154 *Spilornis cheela*	Crested Serpent Eagle
126 *Sturnus pagodarun*	Blackheaded or Brahminy Myna	155 *Hemiprocne longipennis*	Crested Tree Swift
127 *Monarcha azurea*	Blacknaped Monarch Flycatcher	156 *Megalaima haemacephala*	Crimsonbreasted Barbet
128 *Elanus caeruleus*	Blackwinged Kite	157 *Centropus sinensis*	Crow Pheasant
129 *Psittacula cyanocephala*	Blossomheaded Parakeet	158 *Numenius arquata*	Curlew
130 *Monticola cinclorhynchus*	Blueheaded Rock Thrush	159 *Anhinga rufa*	Darter or Snake Bird
131 *Merops philippinus*	Bluetailed Bee eater	160 *Hirundo concolor*	Dusky Crag Martin
132 *Psittacula columboides*	Bluewinged Parakeet	161 *Irena puella*	Fairy Bluebird
133 *Haliastur indus*	Brahminy Kite	162 *Chloropsis aurifrons*	Goldfronted Chloropsis
134 *Metopidius indicus*	Bronzawinged Jacana	163 *Bucerous bicornis*	Great Indian Hornbill
135 *Bubo zeylonensis*	Brown Fish owl	164 *Tringa ochropus*	Green Sandpiper
136 *Muscicapa latirostris*	Brown Flycatcher	165 *Rhopodytes viridirostris*	Greenbilled Malkoha
137 *Lanius cristatus*	Brown Shrike	166 *Ardea cinerea*	Grey Heron
138 *Larus brunnicephalus*	Brownheaded Gull	167 *Gallus senneratii*	Grey Junglefowl
139 *Bubulcus ibis*	Cattle Egret	168 *Francolinus pondicerianus*	Grey Patridge
140 *Ixobrychus cinnamomeus*	Chestnut Bittern	169 *Coturnix coturnix*	Grey Quail
141 *Sitta castanea*	Chestnutbellied Nuthatch	170 *Lanius excubitor*	Grey Shrike
142 *Merops leschenaulti*	Chestnutheaded Bee Eater	171 *Motacilla cinerea*	Grey Wagtail
143 *Otus bakkamoena*	Collared Scops Owl	172 *Sturnus malabaricus*	Greyheaded Myna

173 *Hemicircus canente* Heartspotted Woodpecker
174 *Gracula religiosa* Hill Myna
175 *Upupa epops* Hoopoe
176 *Corvus splendens* House Crow
177 *Passer domesticus* House Sparrow
178 *Apus affinis* House Swift
179 *Tyto alba* Indian Barn Owl
180 *Ploceus philippinus* Indian Baya
181 *Pseudibis papillosa* Indian Black Ibis
182 *Himantopus himantopus* Indian Blackwinged Stilt
183 *Monticola solitarius* Indian Blue Rock Thrush
184 *Turnix suscitator* Indian Bustard Quail
185 *Cursorius coromandelicus* Indian Courser
186 *Chalcophaps indica* Indian Emerald Dove
187 *Oriolus oriolus* Indian Golden Oriole
188 *Bubo bubo* Indian Great Horned Owl
189 *Parus major* Indian Grey Tit
190 *Eudymamys scolopacea* Indian Koel
191 *Coracina novaehollandiae* Indian Large Cuckoo Shrike
192 *Charadrius dubis* Indian Little Ringed Plover
193 *Loriculus vernalis* Indian Lorikeet
194 *Copsychus saularis* Indian Magpie Robin
195 *Nectarinia lotenia* Indian Maroonbreasted Sunbird
196 *Gallinula chloropus* Indian Moorhen
197 *Acridotheres tristis* Indian Myna
198 *Terpsiphone paradisi* Indian Paradise Flycatchers
199 *Pavo cristatus* Indian Peafowl
200 *Anthracoceros malabaricus* Indian Pied Hornbill
201 *Sturnus contra* Indian Pied Myna
202 *Pitta brachyura* Indian Pitta
203 *Ardeola grayii* Indian Pond Heron or Paddybird
204 *Porphyrio porphyrio* Indian Purple Moorhen
205 *Nectarinia asiatica* Indian Purple Sunbird
206 *Nectarinia zeylonica* Indian Purplerumped Sunbird
207 *Saxicoloides fulicata* Indian Rboin
208 *Gallus gallus* Indian Red Junglefowl
209 *Streptopelia tranquebarica* Indian Rufous Turtle Dove
210 *Streptopelia decaocto* Indian Ring Dove
211 *Sterna aurantia* Indian River Tern
212 *Coracias benghalensis* Indian Roller
213 *Pericrocotus flammeus* Indian Scarlet Minivet
214 *Neophron percnopterus* Indian Scavenger Vulture
215 *Streptopelia chinensis* Indian Spotted Dove
216 *Burhinus oedicnemus* Indian Stone Curlew
217 *Orthotomus sutorius* Indian Tailor Bird
218 *Dendrocitta vagabunda* Indian Tree Pie
219 *Chlidonias hybridus* Indian Whiskered Tern
220 *Gyps bengalensis* Indian Whitebacked Vulture
221 *Dicrurus caerulescens* Indian Whitebellied Drongo
222 *Amauronis phoenicurus* Indian Whitebreasted Waterhen
223 *Zosterops palpebrosa* Indian White Eye
224 *Petronia xanthocollis* Indian Yellowthroated Sparrow
225 *Aegithina tiphia* Iora
226 *Turdoides striatus* Jungle Babbler
227 *Perdicula asiatica* Jungle Bush Quail
228 *Corvus macrorhynchos* Jungle Crow
229 *Acridotheres fuscus* Jungle Myna
230 *Falco tinnunculus* Kestrel
231 *Gallicrex cinerea* Kora or Watercock
232 *Phalacrocoraxcarbo* Large Cormorant
233 *Ardea alba* Large Egret
234 *Megalaima zeylanica* Large Green Barbet
235 *Turdoides malcomi* Large Grey Babbler
236 *Psittacula eupatria* Large Indian Parakeet
237 *Motacilla maderaspatensis* Large Pied Wagtail
238 *Dicrurus paradiseus* Large Racket tailed Drongo
239 *Sypheotides indica* Leekh or Lesser Florican
240 *Dinopium benghalense* Lesser Goldenbacked Woodpeck
241 *Anthracoceros coronatus* Lesser Pied Hornbill
242 *Dendrocygna javanica* Lesser Whistling Teal
243 *Phalacrocorax niger* Little Cormorant
244 *Egretta garzetta* Little Egret
245 *Podiceps ruficollis* Little Grebe or Dabchick
246 *Arachnothera longirostris* Little Spiderhunter
247 *Tockus griseus* Malabar Grey Hornbill
248 *Harpactes fasciatus* Malabar Trogon
249 *Myiophonus horsfieldii* Malabar Whistling Thrush
250 *Strix ocellata* Mottled Wood Owl
251 *Nycticorax nycticorax* Night Heron
252 *Anastomus oscitans* Openbill Stork
253 *Zoothera citrina citrina* Orange Headed Ground Thrush
254 *Pandion haliaetus* Osprey
255 *Anthus novaeseelandiae* Paddyfield Pipit
256 *Rostratula benghalensis* Painted Snipe
257 *Galloperdix lunulata* Painted Spurfowl
258 *Mycieria leucocephala* Painted Stork
259 *Cypsiurus parvus* Palm Swift
260 *Milvus migrans* Pariah Kite

261 *Falco peregrinus*	Peregrine Falcon	
262 *Hydrophasianus chirurgus*	Pheasant tailed Jacana	
263 *Saxicola caprata*	Pied Bush Chat	
264 *Clamator jacobinus*	Pied Crested Cockoo	
265 *Ceryle rudis*	Pied Kingfisher	
266 *Anas acuta*	Pintail	
267 *Ardea purpurea*	Purple Heron	
268 *Alcippe poioicephala*	Quaker Babbler	
269 *Estrilda amandava*	Red Munia or Avadavat	
270 *Galloperdix spadicea*	Red Spurfowl	
271 *Pycnonotus cafer*	Redvented Bulbul	
272 *Vanellus indicus*	Redwattled Lapwing	
273 *Pycnonotus jocosus*	Redwhiskered Bulbul	
274 *Perdicula argoondah*	Rock Bush Quail	
275 *Psittacula krameri*	Roseringed Parakeet	
276 *Sturnus roseus*	Rosy Pastor	
277 *Turdoides subrufus*	Rufous Babbler	
278 *Micropternus brachyurus*	Rufous Woodpecker	
279 *Lanius schach*	Rufousbacked Shrike	
280 *Pomatorhinus horsfieldii*	Scimitar Babbler	
281 *Accipiter badius*	Shikra	
282 *Alcedo atthis*	Small Blue Kingfisher	
283 *Megalaima viridis*	Small Green Barbet	
284 *Merops orientalis*	Small Green Bee eater	
285 *Pericrocotus cinnamomeus*	Small Minivet	
286 *Lonchura malacca*		
287 *Platalea leucorodia*	Spoonbill	
288 *Anas poecilorhyncha*	Spotbill Duck	
289 *Athene brama*	Spottd Owlet	
290 *Pellorneum ruficeps*	Spotted Babbler	
291 *Lonchura punctuala*	Spotted Munia	
292 *Pelecanus philippensis*	Spottedbilled or Grey Pelican	
293 *Pelargopsis capensis*	Storkbilled Kingfisher	
294 *Dicaeum erythrorhynchos*	Tickell's Flowerpecker	
295 *Sitta frontalis*	Velvetfronted Nuthatch	
296 *Muscicapa thalassina*	Verditer Flycatcher	
297 *Hirundo rustica*	Western Swallow	
298 *Threskiornis aethiopica*	White Ibis	
299 *Zoothera citrina cyanotus*	White Throated Ground Thrush	
300 *Lonchura striata*	Whitebacked Munia	
301 *Dendrocitta leucogastra*	Whitebellied Tree Pie	
302 *Halcyon smyrnensis*	Whitebreasted Kingfisher	
303 *Pycnonotus luteolus*	Whitebrowed Bulbul	
304 *Rhipidura aureola*	Whitebrowed Fantail Flycatcher	
305 *Turdoides affinis*	Whiteheaded Babbler	
306 *Ciconia episcopus*	Whitenecked Stork	
307 *Hirundo smithii*	Wiretailed Swallow	
308 *Hypsipetes indicus*	Yellowbrowed Bulbul	
309 *Vanellus malabaricus*	Yellow wattled Lapwing	

Mammals

310 *Bandicota indica*	Bandicoot Rat	
311 *Muntiacus muntjak*	Barking deer	
312 *Lepus nigricollis*	Blacknaped hare	
313 *Macaca radiata*	Bonnet Macaque	
314 *Axis axis*	Chital	
315 *Presbytis entellus*	Common Langur	
316 *Herpestus edwardsi*	Common Mongoose	
317 *Paradoxurus hermaphroditus*	Common Plam Civet	
318 *Petarusita philippensis*	Common giant flying squirrel	
319 *Lutra lutra*	Eurasian Otter	
320 *Funambulus pennantii*	Five striped palm squirrel	
321 *Rousettus leshenulti*	Fulvous fruit bat	
322 *Mus musculus*	House Mouse	
323 *Rattus rattus*	House Rat	
324 *Suncus murinus*	House Shrew	
325 *Pteropus giganteus*	Indian Flying Fox	
326 *Vulpes bengalensis*	Indian Fox	
327 *Tatera indica*	Indian Gerbil	
328 *Bandicota bengalensis*	Indian Mole Rat	
329 *Hystrix indica*	Indian creasted porcupine	
330 *Megaderma lyra*	Indian false vampire bat	
331 *Tatera indica*	Indian gerbil	
332 *Ratufa indica*	Indian giant squirrel	
333 *Manis crassicaudata*	IndianPangolin	
334 *Canis aureus*	Jackal	
335 *Felis chaus*	Jungle Cat	
336 *Macaca silenus*	Liontailed Macaque	
337 *Boselaphus tragocamelus*	Nilgai	
338 *Presbytis johni*	Nilgiri Langur	
339 *Kerivoula picta*	Painted bat	
340 *Pipstrellus sp.*	Pipistrelle	
341 *Macaca mulatta*	Rhesus Macaque	

342	*Cervus unicolor*	Sambar	346	*Viverrcula indica*	Small Indian Civet
343	*Cynopterus sphinx*	Short nosed fruit bat	347	*Lutrogale perspicillata*	Smooth Coated Otter
344	*Loris tardigradus*	Slender Loris	348	*Funambulus palmarum*	Three striped palm squirrel
345	*Ursus ursinus*	Sloth Bear	349	*Sus scrofa*	Wild Boar

Butterflies

350	*Ariadne ariadne*	Angled Castor	386	*Euchrysops cnejus*	Gram Blue
351	*Papilio polymnestor*	Blue Mormon	387	*Hypolimnas bolina*	Great Eggfly
352	*Junonia orithyaiè*	Blue Pansy	388	*Hebomoia glaucippe*	Great Orange Tip
353	*Tirumala limniace*	Blue Tiger	389	*Tanaecia lepidea*	Grey Count
354	*Paplio budha*	Budha Peacock	390	*Junonia atlites*	Grey Pansy
355	*Mycalesis sp.*	Bushbrown sp.	391	*Pieris canidia*	Indian Cabbage White
356	*Parthenos sylvia*	Clipper	392	*Arhopala amantes*	Large Oak Blue
357	*Limenitis procris*	Commander	393	*Junonia lemonias*	Lemon Pansy
358	*Appias albina*	Common Albatross	394	*Papilio demoleus*	Lime
359	*Papilio crino*	Common Banded Peacock	395	*Chilades laius*	Lime Blue
360	*Euthalia aconthea*	Common Baron	396	*Idea malabarica*	Malabar Tree Nymph
361	*Graphium sarpedon*	Common Bluebottle	397	*Pachliopta pandiyana*	Malabar or Ceylon Rose
362	*Ariadne merione*	Common Castor	398	*Catopsilia pyranthe*	Mottled Emigrant
363	*Jamides celeno*	Common Cerulean	399	*Colias nilgiriensis*	Nilgiri clouded yellow
364	*Catopsilia pomona*	Common Emigrant	400	*Cynthia cardui*	Painted Lady
365	*Melanitis leda*	Common Evening Brown	401	*Papilio paris*	Paris Peacock
366	*Eurema hecabe*	Common Grass Yellow	402	*Lampides boeticus*	Pea Blue
367	*Cepora nerissa*	Common Gull	403	*Junonia almana*	Peacock Pansy
368	*Actolepis puspa*	Common Hedge Blue	404	*Tajuria cippus*	Peacock royal
369	*Euploea core*	Common Indian crow	405	*Anaphaeis aurota*	Pioneer or Caper White
370	*Graphium doson*	Common Jay	406	*Danaus chrysippus*	Plain Tiger
371	*Delis eucharis*	Common Jezebel	407	*Leptosia nina*	Psyche
372	*Phalanta phalantha*	Common Leopard	408	*Talicada nyseus*	Red Pierrot
373	*Prosotas nora*	Common Line Blue	409	*Cupha erymanthis*	Rustic
374	*Papilio clytia*	Common Mime	410	*Rapala manea*	Slate flash
375	*Papilio polytes*	Common Mormon	411	*Troides minos*	Southern Birdwing
376	*Castalius rosimon*	Common Pierrot	412	*Danaus genutia*	Striped or Common Tiger
377	*Pachliopta aristolochiae*	Common Rose	413	*Graphium agamemnon*	Tailed Jay
378	*Neptis hylas*	Common Sailor	414	*Cethosia nietneri*	Tamil Lacewing
379	*Pareronia valeria*	Common Wanderer	415	*Acraea violae*	Tawny Coster
380	*Spindasis vulcanus*	Common silverline	416	*Zizula hylax*	Tiny Grass blue
381	*Pachliopta hector*	Crimson Rose	417	*Ixias marianne*	White Orange Tip
382	*Hypolimnas misippus*	Daniad Eggfly	418	*Ixias pyrene*	Yellow Orange Tip
383	*Graphium antiphates*	Five banded Swordtal	419	*Junonia hierta*	Yellow Pansy
384	*Ypthima sp.*	Fourring sp.	420	*Leptotes plinius*	Zebra Blue
385	*Euchrysops cnejus*	Gram Blue			

Vectors

421 *Cimax hemipterus*	Bed bug	429 *Sarcoptes scabiei*	Itich mite
422 *Aedes aegypti*	Dengue mosquito	430 *Anopheles culicifacies*	Malaria mosquito
423 *Culex quinquefasciatus*	Filariasis mosquito	431 *Anopheles fluviatilis*	Malaria mosquito
424 *Mansonia sp.*	Filariasis mosquito	432 *Anopheles minimus*	Malaria mosquito
425 *Family: Ixodidae*	Hard tick	433 *Anopheles stephensi*	Malaria mosquito
426 *Tabanus sp.*	Horse fly	434 *Armigerus subalbatus*	Mosquito
427 *Musca domestica*	House fly	435 *Family: Argasidae*	Soft tick
428 *Pediculus humanus*	Human louse		

Diseases of paddy:

Sl.No	*Scientific Name*
436	*Cercospora oryzae*
437	*Drechslera oryzae*
438	*Ephelis oryzae*
439	*MLO, Yellow dwarf*
440	*Pyricularia oryzae*
441	*Rhychosporium oryzae*
442	*Sarocladium oryzae*
443	*Ustilaginoidea virens*
444	*Xanthomonas oryzae*

Insect pests of Paddy:

Sl. No	*Scientific Name*	Sl No:	*Scientific Name*	Sl.No.	*Scientific Name*
445	*Brevennia rehi*	454	*Nephotetthix sp*	463	*Spodoptera mauritia*
446	*Cnaphalocrocis medinalis*	455	*Nilaparvata lugens*	464	*Thaia sp*
447	*Cofona sp*	456	*Nisaga simplex*	465	*Thaia subrufa*
448	*Dicladispa armigera*	457	*Nymphyla depunctalis*		
449	*Hieroglyphus banian*	458	*Orseolia oryzae*		
450	*Hydrella sesakii*	459	*Oxya nitidula*		
451	*Leptocorisa acuta*	460	*Panchaetothrips oryzae*		
452	*Leptocrisa oratoria*	461	*Pelopidas mathias*		
453	*Melanitis leda*	462	*Scirpophaga incertulas*		

Diseases of coconut and arecanut:

466 *Aphids*	472 *Diocalandra frumenti*	478 *Oryctes rhinocerous*	483 *Phytophthora palmivora*
467 *Aspiidiotis destructor*	473 *Gangara thyrsis*	479 *Paradasynus rostrator*	484 *Raoiella indica*
468 *Batrachedra arenosella*	474 *Ganoderma lucidum*	480 *Parasa lepida*	485 *Rhynchophorus ferrugenus*
469 *Ceratomystis arecae*	475 *Macroplectra nareria*	481 *Pestolotia palmarum*	486 *Stephanitis typica*
470 *Conthyla rotunda*	476 *Mealy bugs*	482 *Phyllosticta arecae*	487 *Xylotrupes gideon*
471 *Cyclodes omma*	477 *Opisina arenosella*		

Insect pests of Arecanut:

488 *Aphids*	492 *Mealy bugs*	496 *Stephanitis typica*
489 *Aspidiotis destructor*	493 *Opisina arenosella*	497 *Tirathaba mundella*
490 *Carvalhoia arecae*	494 *Oryctes rhinoceros*	498 *Xylotrupes gideon*
491 *Elymnias caudata*	495 *Raoiella indica*	

Wasps

499 *Ammophila laevigata*
500 *Bember sulphurescens*
501 *Campsomeris quadripustulata*
502 *Chalybion bengalens*
503 *Chrysis costei*
504 *Elis thoracica*
505 *Eumenes conica*
506 *Eumenes flavopicta*
507 *Eumenidae*
508 *Methoca sp.*
509 *Mutilla dimidiata*
510 *Mutilla sexmaculata*
511 *Philanthes ramadrishnae*
512 *Polistes olivaceous*
513 *Polistes stigma*
514 *Pompilus analis*
515 *Rhynchium abdominale*
516 *Ropalidia cyathiformis*
517 *Ropalidia marginata*
518 *Ropalidia montana*
519 *Ropalidia spatulata*
520 *Ropalidia variegata*
521 *Scelephron madraspatinum*
522 *Scolia flavifrons*
523 *Sphecidae*
524 *Sphex argentatus*
525 *Sphex lobatus*
526 *Stilbum cyanarum*
527 *Tiphia hirsutum*
528 *Tiphia rufofemorata*
529 *Vespa tropica*

Spiders

530 *Argiope anasuja*
531 *Argiope arcuata*
532 *Argiope catenulata*
533 *Cryptophora cicatrosa*
534 *Gasteracantha geminata*
535 *Gasteracantha remifera*
536 *Herennia ornatissima*
537 *Leucauge clebesiana*
538 *Leucauge decorata*
539 *Nephila maculata*
540 *Oxyopes sp.*
541 *Peucitia viridana*
542 *Plexippus paykulli*
543 *Tetragantha mandibulata*
544 *Thomisus pugilis*

Aquatic macroinvertebartes

545 *Family: Planariidae* Flatworms
546 *Oligochaeta* Earthworms
547 *Hirudinea* Leeches

Mayflies (Ephemeroptera)

548 *Baetidae*
549 *Caenidae*
550 *Ephemerellidae*
551 *Ephemeridae*
552 *Heptageniidae*
553 *Isonichidae*
554 *Leptophlebiidae*
555 *Neoephemeridae*
556 *Palingenidae*
557 *Polymitarcyidae*
558 *Potamanthidae*
559 *Prosopistomatidae*
560 *Trichorythidae*

Damselflies (Odonata)

561 *Calopterygidae*
562 *Chlorocyphidae*
563 *Coenagrionidae*
564 *Lestidae*
565 *Platycnemididae*

Dragonflies(Odonata)

566 *Aeschnidae*
567 *Corduliidae*
568 *Gomphidae*
569 *Libellulidae*

Stoneflies (Plecoptera)

570 *Perlidae*

Aquatic bugs (Hemiptera)

571 *Notonectidae* — Backswimmers
572 *Naucoridae* — Creeping water bugs
573 *Belostomatidae* — Giant water bugs
574 *Mesoveliidae* — Pond Skaters
575 *Pleiidae* — Small Backswimmers
576 *Hebridae* — Velvet water bugs
577 *Nepidae* — Water Scorpions
578 *Veliidae* — Water Skaters
579 *Ranatridae* — Water Stick insects
580 *Corixidae* — Water boatmen
581 *Hydrometridae* — Water measurers
582 *Geridae* — Water striders

Caddisflies(Trichoptera)

583 *Calamoceratidae*
584 *Dipseudopsidae*
585 *Ecnomidae*
586 *Glossomsomatidae*
587 *Goeridae*
588 *Helicopsychidae*
589 *Hydrobiosidae*
590 *Hydropsychidae*
591 *Hydroptilidae*
592 *Lepidostomatidae*
593 *Leptoceridae*
594 *Limnephilidae*
595 *Molannidae*
596 *Philopotamidae*
597 *Phryganopsychidae*
598 *Polycentropodidae*
599 *Psychomyiidae*
600 *Rhyacophilidae*
601 *Stenopsychidae*
602 *Xiphocentronidae*

Moths (Lepidoptera)

603 *Pyralidae*

Beetles (Coleoptera)

604 *Hydrophilidae*
605 *Psephenidae*
606 *Dytiscidae* — Diving beetles
607 *Curculionidae* — Weevils
608 *Gyrinidae* — Whirligig beetles

Alder Flies (Neuroptera & Megaloptera)

609 *Corydalidae* — Dobsonflies and Fishflies
610 *Sisyridae* — Spongillaflies

Flies (Diptera)

611 *Simulidae* — Blackflies
612 *Tipulidae* — Craneflies
613 *Chironomidae* — Midges
614 *Culicidae* — Mosquitoes
615 *Tabanidae* — Horseflies
616 *Asilidae*
617 *Psychodidae*

Freshwater Molluscs

Snails (Gastropoda)

618 *Aetheriidae*
619 *Ancylidae*
620 *Bithynidae*
621 *Bivalvia*
622 *Corbiculidae*
623 *Littorinidae*
624 *Lymnidae*
625 *Neritidae*
626 *Pilidae*
627 *Planorbidae*

Format for Writing Bird Accounts

1. Common English name

2. Scientific name along with taxonomic category as appropriate (order, family)

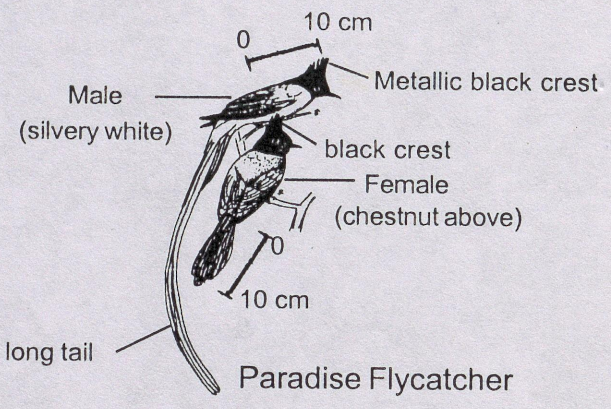
3. Poems or verses available or specially composed, preferably from Indian sources

4. Succinct statement of what the organism is. (a jet black medium sized bird with a long forked tail).

5. Interesting facts, popular beliefs, folklore and myths (school going children believe that seeing one myna brings sorrow, seeing two mynas brings joy and seeing three mynas together means a letter from a friend or relative).

6. Derivation of the scientific and popular names, if interesting (Jungle Babbler is commonly called 'Saathbhai' because it always occurs in flocks).

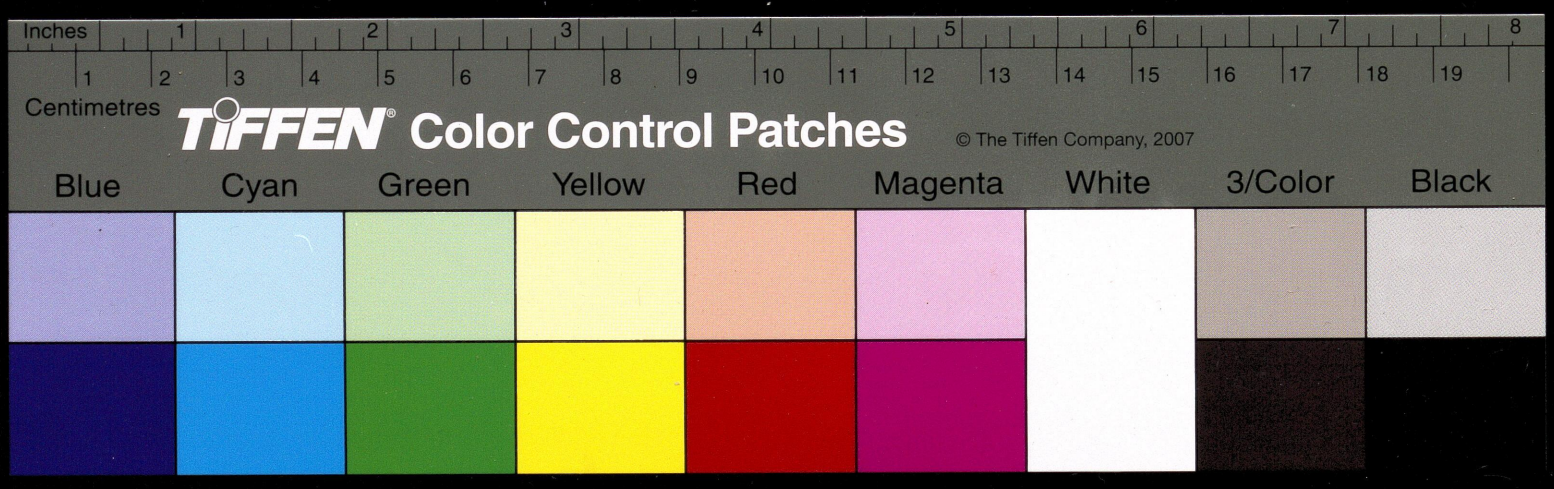
7. Morphological characters of both male and female and their seasonal polymorphic forms significant for field identification. [Provide sketches with arrow pointing to their diagnostic characters].
   1. Colour, size, shape and markings of
      i). Head: eye, bill
      ii). Body: belly, chest, neck, back
      iii). Wings
      iv). Tail
      v). Legs
   2. Flight pattern



Paradise Flycatcher

8. Related taxa with which appearance may be confused (Black Drongo may be confused with Ashy Drongo since both look alike. The only difference is that Black Drongo have brown black eye whereas the eyes of Ashy Drongo are crimson red in colour. Black Drongo can be seen in open areas whereas Ashy Drongos prefer forest). [Provide sketches with arrow pointing to their distinguishing characters].

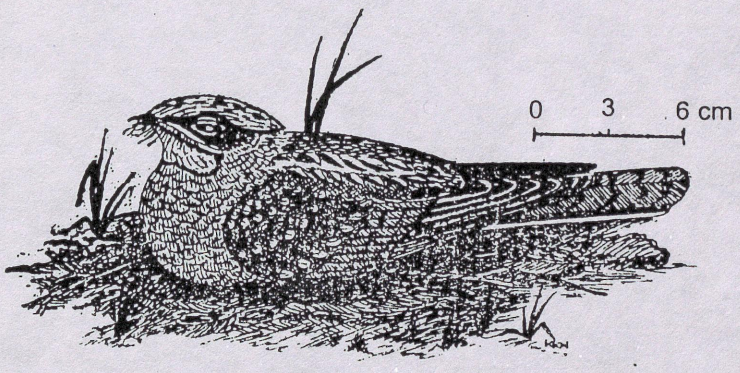
9. Levels of diversity within the taxon at global and Indian level, any interesting aspect of evolutionary history especially in case of higher taxonomic categories.



10. Distribution:
    a. Global in 6 biogeographic zones [Oriental, Australian, Palearctic, Ethiopian, Nearctic, Neotropical]. **Refer Appendix I**
    b. Indian in 10 biogeographic provinces [as per Rodgers and Panwar] **Refer Appendix II**
    c. In terms of bioclimate. **Refer Appendix III**
    d. In terms of temperature and altitudinal zone . **Refer Appendix IV**
    e. In terms of specific locality, if the distribution is rather restricted. Well known centres of breeding or wintering (Bharatpur or Vedanthayal)

11. Habitat preference: **Refer Appendix V**
    a. Macrohabitat (terrestrial habitats, freshwater – stagnant and flowing, marine, estuarine).
    b. Microhabitat: Stratum of vegetation.
    c. Habitat specialization (perches on treetop or poles, scurries around leaf litter on forest floor).

12. Adult behaviour. [Provide sketches wherever necessary].
    a. Solitary/social, group size, social organization (Yellowwattled Lapwing can be seen in pairs or in small flocks on dry ground).
    b. Daily activity pattern (vultures start soaring after it heats up), roosting behaviour.
    c. Sound production (Tailor Bird has a loud 'towit towit towit' or 'pretty pretty pretty' call or the Redwattled Lapwing a characteristic "did he do it" or "did did did did" call at rest and in flight).
    d. Food, feeding, foraging behaviour.
    e. Predators, parasites, anti-predatory behaviour, camouflage, mimicry in call and



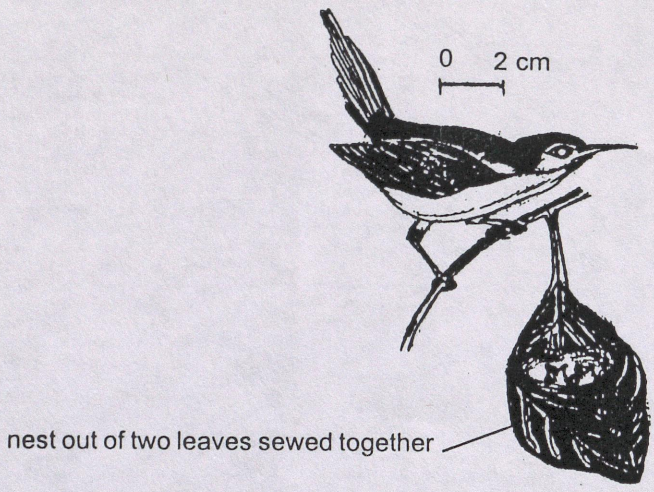
Camouflage (Nightjar)

appearance, alarm calls, mobbing.

13. Life cycle: Breeding season, breeding behaviour (change in colour, call), territoriality, nesting, parental care, courtship behaviour (the male pigeon struts round and round as part of its courtship to attract the female), Nesting site (ground, tree holes, houses etc.). [Provide sketches if possible].

    Egg: Colour, size, shape, markings and number.

    Immature stages: Colour, diagnostic feature such as the young ones of Redwattled Lapwing have a red beak and brownish head, chin, throat with a largely white neck.



Tailor Bird

14. Seasonal changes: Seasonal changes in abundance, long range movement or migration (time, distance, destination etc.) (Golden Oriole from Himalaya migrate to Southern India during winter i.e. from October to March).

15. Human significance: Source of food, other economic value such as pest control, pollinator or damage to crops, cultural significance, religious feelings.

16. Extent of range and levels of population abundance, sources of change in range and population levels such as habitat destruction, poisoning by persistent pesticides, harvests.

17. Conservation status, Listing in red data books, any legal protection such as listing in Wildlife Protection Acts or CITES, ongoing attempts at conservation, propagation or eradication. [State source of information]

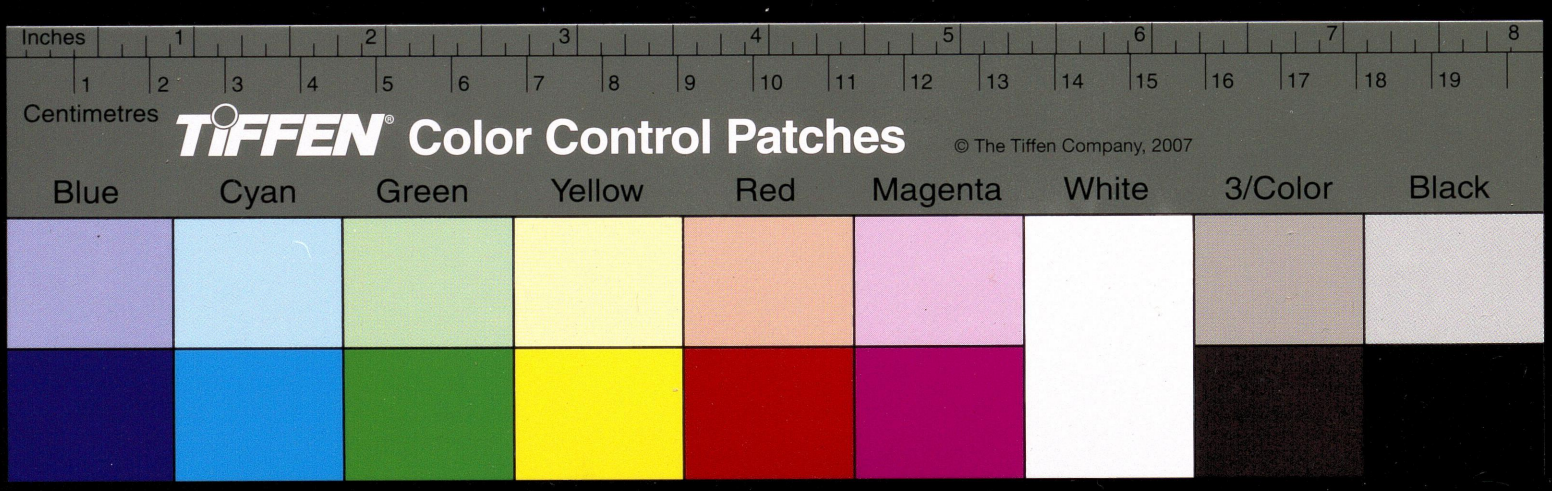
18. Succinct statement of ecological survey methods appropriate to population assessment of the concerned taxon.

19. Notable ecological adaptations, occurrence in different successional stages, status as indicator organisms, ecological role and significance, relevance to ecosystem services (Scavenger Vultures feed on dead animal and hence help in keeping the environment healthy and clean), special features. Notable interactions with other species, such as seed dispersal, (Sunbirds are known for dispersal of *Loranthus* seeds), mutual association (Crow – Koel relationship, the Koel never constructs a nest but lays her eggs in the Crow's nests where the hatchlings are cared for by their foster parents). [Such information may be highlighted so as to stimulate student interest and promote student projects].

20. Suggested student projects: Any special adaptation or behaviour pattern that merits study. Major gaps in available information on the taxon that merit investigation.

21. Local names in as many Indian languages and dialects as possible.

22. Experts, centers of important research on the taxon.



23. Significant publications on the taxon [These may be provided alphabetically in a standard form as in the *Journal of Biosciences*, Indian Academy of Sciences, Bangalore].

Ali S 1996 *The book of Indian birds* (Mumbai: Oxford University Press)

Ali S 1932 Flower birds and bird flowers in India; *J. BNHS* **35** 573 - 605

24. Significant repositories of collection of specimens of the taxon.

25. List of technical terms used in the account, arranged alphabetically.

26. Names and addresses of contributors – writing, illustration, reviewing, revision and rewriting.