BASICS OF WILDLIFE HEALTH CARE AND MANAGEMENT

Rajesh Jani

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The book on **Basics of Wildlife Healthcare and Management** provides the basic information about the introduction of wildlife course by the Veterinary Council of India for veterinary graduate. The book has been planned looking its theme and basic understanding of the various topics which will be useful for biologist, zoologist, veterinarians working in forest ,zoos or at field level where they use to get wild animals for post mortem or for treatment. It also provides helpful information to the forest officers, zoo managers and protected area managers for critical care management and for doing needful things before approaching a veterinarian to save the life of animal or to collect biological material useful for diagnosis.

Rajesh Jani: He is having experience of more than 25 years in academic and research field. Received FIVE awards in academics and research, including Hari oum Ashram Award and Professional Excellency Award in Wildlife Health management. As a member of All India Wildlife and zoo veterinarian association he acted as a secretary for the western region and is an active member. He has published 64 clinical and research articles in National and International Journals, six books and presented lead articles in several seminars and symposiums. As a nominee by the government, during his U.S.A. academic tour visited many wildlife refuses and veterinary schools. He is an active member in 15 different organizations such as Zoo Outreach Organization (ZOO), Captive Breeding Specialist Group (CBSG), Founder member of Society for Promotion of history of Zoos and Natural History in India, (SPOHZ*NHI), Asian Regional Network of International Zoo Educators (ARNIZE), Association of Indian Zoo and Wildlife Veterinarians (AIZWV) and wildlife health advisory member for Gujarat state and coordinator for western region for Indian Wildlife Health Cooperative programme as well as for WHIP.

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Dedicated
to
My family
and
Wildlife workers

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Preface

The book of Basics of Wildlife Healthcare and Management was a long thought from my involvement in wildlife field. During study at Wildlife Institute of India, Dehradun and thereafter at USA study tour meeting with many renowned wildlife veterinarians and biologist including Dr.Murry Fowler, Dr.Scott Citino, Dr.F.J.Dein and many more realized me to do little contribution for the Indian wild animal health care and management. Upon introduction of wildlife course for veterinary graduate, the book has been planned looking its theme and basic understanding of the various topics like wildlife, status of animals on taxonomical and IUCN level, biological variations,ethology, their nutrition, ex- situ and insitu conservation, restrain, handling, orphan management, captive management, zoonotic diseases, forensic and legal understanding, surgical interventions and conditions, reproductive base line information, rescue operation, critical care management, various forms required for legal procedure, post mortem techniques and collection,preservation and dispatch of biomaterials, medical management of reptiles, exotic birds health care and management have been covered along with preparedness of disaster management with a view of holistic approach.

I am highly thankful to several authors from them I have compiled some of the matter. The basic purpose of this book is to have awareness on healthcare and management for the undergraduate, post graduate, teachers, wildlife workers, foresters, zoo veterinarians and many more who loves wild animals and do little for their conservations. I am very grateful to all who directly or indirectly supported me for this outcome.

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A few lines are too short to account for my deep gratitude towards my colleagues Dr.A.B.Srivastava, Dr.Naseer Ahmed, Dr.M.G.Jayathangaraj, Dr.S.K.Mishra, Dr.Mark Drew, Dr.Jim Sikarski, Dr.Julia, Dr.Scott Citino, Dr.Tracy, Dr.D.Swarup and many more who encouraged guided and nurture my developing period in wildlife. I thank them for their kind support, guidance, indispensable suggestions, untiring help and splendid assistance. Their extensive discussions, company around my work and interesting explorations have been of great value in this field. I also thank my guide, Guru and Ex.Professor and Head Dr. P.R.Patel.

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My parents,wife, son and daughter along with othe family members especially Jayesh, Minal, Vidhi, Yagna, Om, Hiru, and David boon - Raxa are also appreciated for their cordial love.

The special thanks to Narendra Publishers without their periodical reminders this output may not be in your hand. Finally, I will appreciate any suggestions, modification and updates from your feedback for this book.

Anand **(Rajesh Jani)**

Date: 07 / 06 /2020

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I am highly enriched by referring the following book and used some of the matter from the following books. I respect all the authors and appreciate their contribution in the field of wildlife management.

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CHAPTER 1

INDIAN WILDLIFE

India's biodiversity is both rich and varied. The heritage of vivid wildlife of India attracts the world tourist and wildlifers for its magnificient flora and fauna. The country is one of the 12 mega diversity areas in the world, in terms of animal. India is unique in the richness and diversity of its vegetation and wildlife. Almost 340 plus mammal species, over a thousand and two hundred species of birds in nearly 2100 forms and more than 30,000 species of insects - provide evidence to the wealthiness of wildlife in India. Besides, there are a number of species of fish, amphibians and reptiles.With over 4.5% of its geographical area covered by more than 89 national parks and 489 sanctuaries, the range and diversity of India's wildlife heritage matches the grandeur and magnificence of her civilization.

India's national parks and wild life sanctuaries from Laddakh in Himalayas to Southern tip of Tamilnadu. These parks, reserves, sanctuaries and forests are vital to the conservation of endangered species, such as Bengal tiger, the Asiatic Elephant, Lion, the Snow Leopard and Saras Crane. India's first national park, the Corbett was established in the foothills of Himalayas. It supports a great variety of mammals and over 585 species of birds. The wild elephant population is on the increase and both tiger and leopard are regularly seen. Kanha National Park is the largest of the original tiger reserves. The park is noted for its local herd of swamp deer. Also a species of the swamp deer found in Kanha A third subspecies (and the largest population) of swamp deer is at the Dudhwa National Park in the northeastern UP. The magnificent bird sanctuary at Bharatpur Provides a vast breeding area for the native water birds.

During the winters (November-March) migratory birds arrive in large numbers, including the Siberian Crane. In the Indian deserts, the most discussed bird is the Great Indian bustard. In western Himalayas, one can see birds like Himalayan monal pheasant, western tragopan, white crested khalij cheer pleasant and griffon vultures, In the Andaman and Nicobar region, about 250 species and sub species of birds are found, such as rare Narcondum hornbill, Nicobar pigeon and megapode. Here are also other birds like white bellied sea eagle, white breasted swiftlet and several fruit pigeons. All these could be observed in Andaman's six national parks and over ninety wildlife sanctuaries.

The Himalayas (foothills) are known for big mammals like elephant, sambar, swamp, deer, cheetal, wild boar tiger, panther, hyena, black bear, sloth bear, porcupine, Great Indian one horned rhinoceros, wild buffalo, gangetic gharial, golden langur. Wild ass, sheep, deers, smaller mammals, snow leopards, wolf, cats and brown bears are in plenty in the western Himalayas. While the national park and sanctuaries of northern and central India are better known, there are quite a few parks and sanctuaries in South India, too, e.g., Madumalai in Tamil Nadu and Bandipur Tiger Reserve and Nagarhole National Park in Karnataka.

A glimpsis of western zone thrills us with countries richest wild carnivores such as the king of beast Asiatic lion in Greater Gir, tigers in Ranthambhore and Sariska of Rajasthan, leopard, wolf, hyena, sloth bears,wild ass,great Indian bustard,saras crane and the visit of flamingo city of Kutch region of Great Gujarat remind us the richness of biodiversity tour of Indian wildlife sanctuaries and national parks as a favours travelmasti.

WHAT IS WILDLIFE?

Wildlife is a term that does not enjoy a precise or a universally accepted definition. The term implies all things that are living outside direct human control and therefore includes those plants and animals that are **not cultivated or domesticated**. In its fullest meaning, wildlife encompasses insects and fungi, frogs and wild flowers, as well as doves, deer, and trees. Nonetheless, organizations concerned with wildlife generally favor the so-called *higher* forms of animal life**.**

WHAT IS WILDLIFE MANAGEMENT?

Management means judicious use of the available resources. In general, **wildlife management** is the application of ecological knowledge to populations of vertebrate animals and their plant and animal association in a manner that strikes a balance between the needs of those populations and the needs of people, until the 1960s wildlife management was primarily game management, the husbandry and regulation of populations of birds and mammals hunted for sport. Wildlife management is changing, but its past remains relevant to the present and future. The practice of wildlife management is rooted in the intermingling of human ethics, culture, perceptions, and legal concepts.

IMPORTANCE OF WILDLIFE

1. Ecological value
2. Scientific value
3. Economic value

4. Genetic resources (Conservation)
5. Biological diversity
6. Pleasure value
7. Asthetic Value
8. Game values
9. Ethical value

1. **Ecological value :** Conservation of life maintains a balance of nature through biogeochemical cycles, food chains, population controls by positive and negative feedback. If a species is lost in long run, it may upset the natural balance and as a consequence makes the system vulnerable. **A network involving in the interactions of living and nonliving elements in a manner that sustains life- is called an ecosystem;** Living organisms borrow oxygen, carbon dioxide, and nutrients from the ecosystem and then return these materials through the processes of respiration, excretion, and decomposition. The living part of an ecosystem, at any given times and places, is known as the **biotic community,** or more simply the **community**. The tiger , lions can be considered as at apex and as a top predator who depends on the base of the pyramid.
2. **Scientific and educational value :** to study the normal anatomy, physiology and body related data, efficacy and administration of drugs, genetically for population modelling etc.
3. **Aesthetic and ethical value :** On welfare base and for aesthetic and ethical value one should conserve the wild life.
4. **Conservation:** To propagate a specific species and to translocate, relocate and reintroduction programme.
5. **Recreational and economical value :** By keeping wild animals in captivity the revenue can be generated for fund raising and maintaining the zoos and can be also use as study material for conservation of a specific species.

HOW TO CONSERVE THE WILDLIFE?

Conservation (Maintenance and propagation of a viable population of a species) can be done either by

1. **In situ :** means keeping the wild animals in the nature either in National Park, wildlife sanctuaries or in wild status in any protected areas.
2. ***Ex situ* :** means keeping the wild animals either in captivity in close observation in a specific enclosure or in a wider area of captivity , safari park or in advanced form of *frozen zoos*.

WILDLIFE ECOSYSTEMS AND NATURAL COMMUNITIES

Civilization is a state of mutual and interdependent cooperation between human animals, other animals, plants and soil, which may be disrupted at any moment by the failure of any of them. Each of the species we call wildlife participates in a vast network of life- a system in which nonliving elements are brought into the tissues of living organisms. These elements then undergo exchanges between plants and animals and finally again enter the physical environment. Such **'a network involving in the interactions of** living and nonliving elements in a manner that sustains life- is called an ecosystem, Living organisms borrow oxygen, carbon, dioxide, and nutrients from the ecosystem and then return these materials through the processes of respiration, excretion, and decomposition. The living part of an ecosystem, at any given time and place, is known as the **biotic community,** or more simply the **community.** An ecosystem usually consists of several communities, each having distinctive groups of plants and animals. Nonetheless, whether dominated by bacteria, trees, amoebas. or whales, communities are identifiable association of plants and animals living in a finite physical environment.

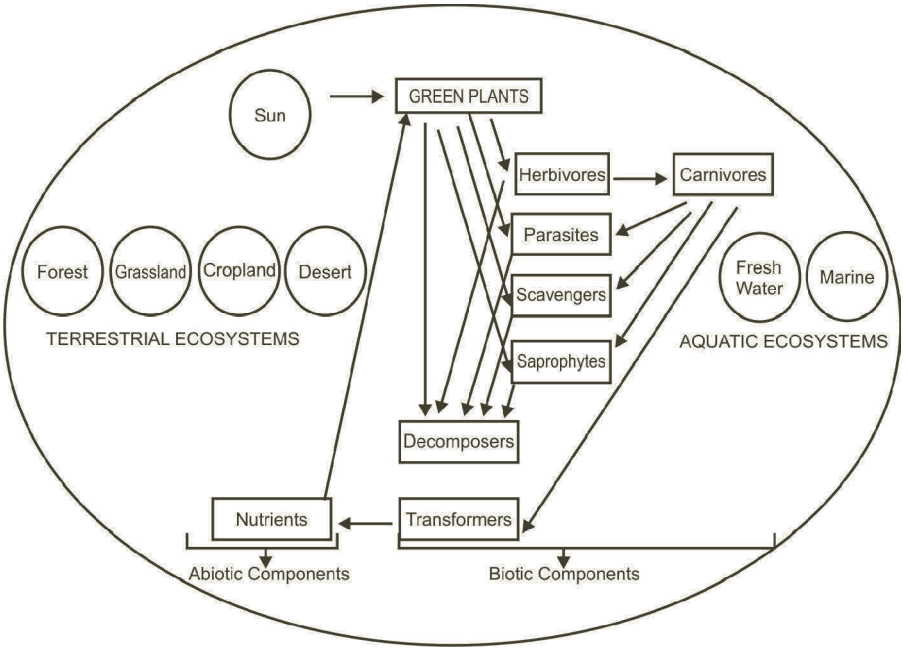
TYPES OF ECOSYSTEMS

A. Natural Ecosystems :

1. **Terrestrial :** Forest, grassland, desert etc. These operate under natural conditions without any major interference by man.
2. **Aquatic :** Fresh water
   - **a. Lotic :** Running water as spring, stream or rivers.
   - **b. Lentic :** Standing water as lake, pond, pools, puddles,ditch, swamp, etc.
   - **c. Marine** : Deep bodies **as ocean or shallow ones** as seas **or** an estuary, etc.

B. Artificial (Man - engineered) Ecosystems : Man-engineered ecosystems: Crop, Urban, Cropland, Spacecraft etc.

Microecosystem : The complete ecological system of an area, including the plants, animals and the environmental factors is known as ecosystem. The ecosystem as that approach, in which habitat, plants and animals are all considered as one interacting unit; materials and energies of one passing in and out of the others.



Diagrammatic Representation of Biosphere

Table 1. Biogeographic Classification of India

	Biogeographic Zone	Biotic Province	Some of major wild fauna
1.	Trans-Himalayan	Tibetan	Snow leopard, Musk deer,
2.	Himalayan	North West, West, Central and East Himalaya	Elephant ,leopard, goral, clouded leopard, rhinoceros Manipur deer, wild buffaloes, pheasant birds and reptiles
3.	Desert	Kutch, Thar, Rajasthan	Wolf, foxes, jackals, hyaena, tiger, leopards, jungle cats
4.	Semi- arid	Punjab, Gujarat-rajwada,	Cheetal, leopards, nilgai, wild cats
5.	Western Ghat	Malabar Coast, Mountains of Western Ghat	Elephant, gaur, tiger, leopard, lion-tail macaque
6.	Deccan Peninsula	Southern , Central and Eastern Deccan Plateau, Central high lands, Chhota-Nagpur area	Tiger, leopard, lion(confined to Gir),wild ass, wild dogs, sambhar, barasingha
7.	Gengetic Plain	Upper and lower Gengetic plain	Sambhar, tiger, leopard, peafowl, jungle fowl
8.	North-East India	Brahmaputra Valley, Assam hills	Elephant, rhinocerous, gibbons, flying squirrels
9.	Islands	Andaman, Nicobar and Lakshadweep islands	Marine mammals, local and migratory birds, Andaman pig
10.	Coasts	West and East Coast	Marine creatures, turtles

Conservation area: Conservation Areas are areas of notable environmental or historical interest or importance which is protected by law against undesirable changes. These areas are conserved by varying levels of legal protectionwhich are given by the policies formulated by the government or global conventions.

Following are the major Conservation Areas in India:

Table 2. Important Conservation Sites in India (as on February, 2019)

Reserves/ Sites	Numbers	Total area (in Sq.Kms.)
Tiger Reserves	50	71027.10
Elephant Reserves	32	69,582.80
Biosphere Reserves	18	87491.6
RAMSAR Wetland Sites	27	11121.31
Natural World Heritage Sites	07	11755.84
Cultural World Heritage Sites	28	—
Mixed World Heritage Sites	01	1784.00
Important Coastal and Marine Biodiversity Areas	107	10773.07
Marine Protected Areas	131	9801.13
Important Bird Areas	467	—
Potential Important Bird Areas	96	—
Key Biodiversity Areas	531	—
Biodiversity Heritage Sites	9	—

Geographical Area of India (http://knowindia.gov.in/) = 32,87,263 km^2

Forest cover of India (FSI, 2017) = 7,08,273 km^2

Percentage Area under Forest cover = 21.54 % of Geographical Area of India

(**Source:** Forest Survey of India)

Table 3. Protected Areas of India (July, 2019)

	Total Area (km^2)	Coverage % of Country	
National Parks (NPs)	104	40501.13	1.23
Wildlife Sanctuaries (WLSs)	551	119775.80	3.64
Conservation Reserves (CRs)	88	4356.49	0.13
Community Reserves	127	525.22	0.02
Protected Areas (PAs)	870	165158.54	5.02

What is a National Park?

An area, whether within a sanctuary or not, can be notified by the state government to be constituted as a National Park, by reason of its ecological, faunal, floral, geomorphological, or zoological association or importance, needed to for protecting & propagating or developing wildlife therein or its environment.

No human activity is permitted inside the national park except for the ones permitted by the Chief Wildlife Warden of the state under the conditions given in CHAPTER IV, WPA 1972.

There are 104 existing national parks in India covering an area of 40501.13 km2, which is 1.23% of the geographical area of the country (National Wildlife Database, May, 2019).

Table 4. National Parks of India

State	S.No.	Name of State/ Protected Area	Year of Establishment	Area (km^2)
Andaman & Nicobar Islands	1	Campbell Bay NP	1992	426.23
Andaman & Nicobar Islands	2	Galathea Bay NP	1992	110
Andaman & Nicobar Islands	3	Mahatama Gandhi Marine (Wandoor) NP	1983	281.5
Andaman & Nicobar Islands	4	Middle Button Island NP	1987	0.44
Andaman & Nicobar Islands	5	Mount Harriett NP	1987	46.62
Andaman & Nicobar Islands	6	North Button Island NP	1987	0.44
Andaman & Nicobar Islands	7	Rani Jhansi Marine NP	1996	256.14
Andaman & Nicobar Islands	8	Saddle Peak NP	1987	32.54
Andaman & Nicobar Islands	9	South Button Island NP	1987	0.03
Andhra Pradesh	1	Papikonda NP	2008	1012.86
Andhra Pradesh	2	Rajiv Gandhi (Rameswaram) NP	2005	2.4
Andhra Pradesh	3	Sri Venkateswara NP	1989	353.62
Arunachal Pradesh	1	Mouling NP	1986	483
Arunachal Pradesh	2	Namdapha NP	1983	1807.82
Assam	1	Dibru-Saikhowa NP	1999	340
Assam	2	Kaziranga NP	1974	858.98
Assam	3	Manas NP	1990	500
Assam	4	Nameri NP	1998	200
Assam	5	Rajiv Gandhi Orang NP	1999	78.81
Bihar	1	Valmiki NP	1989	335.65
Chhattisgarh	1	Guru Ghasidas (Sanjay) NP	1981	1440.705
Chhattisgarh	2	Indravati (Kutru) NP	1982	1258.37
Chhattisgarh	3	Kanger Valley NP	1982	200
Goa	1	Mollem NP	1992	107
Gujarat	1	Vansda NP	1979	23.99
Gujarat	2	Blackbuck (Velavadar) NP	1976	34.53
Gujarat	3	Gir NP	1975	258.71
Gujarat	4	Marine (Gulf of Kachchh) NP	1982	162.89

[Table Contd.

Contd. Table]

State	S.No.	Name of State/ Protected Area	Year of Establishment	Area (km^2)
Haryana	1	Kalesar NP	2003	46.82
Haryana	2	Sultanpur NP	1989	1.43
Himachal Pradesh	1	Great Himalayan NP	1984	754.4
Himachal Pradesh	2	Inderkilla NP	2010	104
Himachal Pradesh	3	Khirganga NP	2010	710
Himachal Pradesh	4	Pin Valley NP	1987	675
Himachal Pradesh	5	Simbalbara NP	2010	27.88
Jammu & Kashmir	1	City Forest (Salim Ali) NP	1992	9
Jammu & Kashmir	2	Dachigam NP	1981	141
Jammu & Kashmir	3	Hemis NP	1981	3350
Jammu & Kashmir	4	Kishtwar NP	1981	425
Jharkhand	1	Betla NP	1986	226.33
Karnataka	1	Anshi NP	1987	417.34
Karnataka	2	Bandipur NP	1974	874.2
Karnataka	3	Bannerghatta NP	1974	260.51
Karnataka	4	Kudremukh NP	1987	600.32
Karnataka	5	Nagarahole (Rajiv Gandhi) NP	1988	643.39
Kerala	1	Anamudi Shola NP	2003	7.5
Kerala	2	Eravikulam NP	1978	97
Kerala	3	Mathikettan Shola NP	2003	12.82
Kerala	4	Pambadum Shola NP	2003	1.318
Kerala	5	Periyar NP	1982	350
Kerala	6	Silent Valley NP	1984	89.52
Madhya Pradesh	1	Bandhavgarh NP	1968	448.85
Madhya Pradesh	2	Dinosaur Fossils NP	2011	0.8974
Madhya Pradesh	3	Fossil NP	1983	0.27
Madhya Pradesh	4	Indira Priyadarshini Pench NP	1975	292.85
Madhya Pradesh	5	Kanha NP	1955	940
Madhya Pradesh	6	Madhav NP	1959	375.22
Madhya Pradesh	7	Panna NP	1981	542.67
Madhya Pradesh	8	Sanjay NP	1981	466.88
Madhya Pradesh	9	Satpura NP	1981	585.17
Madhya Pradesh	10	Van Vihar NP	1979	4.45
Maharashtra	1	Chandoli NP	2004	317.67
Maharashtra	2	Gugamal NP	1975	361.28

[Table Contd.

Contd. Table]

State	S.No.	Name of State/ Protected Area	Year of Establishment	Area (km^2)
Maharashtra	3	Nawegaon NP	1975	133.88
Maharashtra	4	Pench (Jawaharlal Nehru) NP	1975	257.26
Maharashtra	5	Sanjay Gandhi (Borivilli) NP	1983	86.96
Maharashtra	6	Tadoba NP	1955	116.55
Manipur	1	Keibul-Lamjao NP	1977	40
Meghalaya	1	Balphakram NP	1985	220
Meghalaya	2	Nokrek Ridge NP	1986	47.48
Mizoram	1	Murlen NP	1991	100
Mizoram	2	Phawngpui Blue Mountain NP	1992	50
Nagaland	1	Intanki NP	1993	202.02
Odisha	1	Bhitarkanika NP	1988	145
Odisha	2	Simlipal NP	1980	845.7
Rajasthan	1	Desert NP	1992	3162
Rajasthan	2	Keoladeo Ghana NP	1981	28.73
Rajasthan	3	Mukundra Hills NP	2006	200.54
Rajasthan	4	Ranthambhore NP	1980	282
Rajasthan	5	Sariska NP	1992	273.8
Sikkim	1	Khangchendzonga NP	1977	1784
Tamil Nadu	1	Guindy NP	1976	2.82
Tamil Nadu	2	Gulf of Mannar Marine NP	1980	6.23
Tamil Nadu	3	Indira Gandhi (Annamalai) NP	1989	117.1
Tamil Nadu	4	Mudumalai NP	1990	103.23
Tamil Nadu	5	Mukurthi NP	1990	78.46
Telangana	1	Kasu Brahmananda Reddy NP	1994	1.43
Telangana	2	Mahaveer Harina Vanasthali NP	1994	14.59
Telangana	3	Mrugavani NP	1994	3.6
Tripura	1	Clouded Leopard NP	2007	5.08
Tripura	2	Bison (Rajbari) NP	2007	31.63
Uttar Pradesh	1	Dudhwa NP	1977	490
Uttarakhand	1	Corbett NP	1936	520.82
Uttarakhand	2	Gangotri NP	1989	2390.02
Uttarakhand	3	Govind NP	1990	472.08
Uttarakhand	4	Nanda Devi NP	1982	624.6
Uttarakhand	5	Rajaji NP	1983	820
Uttarakhand	6	Valley of Flowers NP	1982	87.5

[Table Contd.

Contd. Table]

State	S.No.	Name of State/ Protected Area	Year of Establishment	Area (km^2)
West Bengal	1	Buxa NP	1992	117.1
West Bengal	2	Gorumara NP	1992	79.45
West Bengal	3	Jaldapara NP	2014	216.51
West Bengal	4	Neora Valley NP	1986	159.89
West Bengal	5	Singalila NP	1986	78.6
West Bengal	6	Sunderban NP	1984	1330.1

(**Source:** National Wildlife Database, Wildlife Institute of India)

What is Wildlife Sanctuary ?

Any area other than area comprised with any reserve forest or the territorial waters can be notified by the State Government to constitute as a sanctuary if such area is of adequate ecological, faunal, floral, geomorphological, natural. or zoological significance, for the purpose of protecting, propagating or developing wildlife or its environment. Some restricted human activities are allowed inside the Sanctuary area details of which are given in CHAPTER IV, WPA 1972.

There are 551 existing wildlife sanctuaries in India covering an area of 119775.80 km2, which is 3.64 % of the geographical area of the country (National Wildlife Database, May, 2019).

Table 5. Protected Areas of India

State	National Parks	Wildlife Sanctuaries	State	National Parks	Wildlife Sanctuarie
Andaman & NicobarIslands	9	96	Maharashtra	6	42
Andhra Pradesh	3	13	Madhya Pradesh	10	25
Arunachal Pradesh	2	11	Manipur	1	2
Assam	5	18	Meghalaya	2	4
Bihar	1	12	Mizoram	2	8
Chandigarh	–	2	Nagaland	1	3
Chhattishgarh	3	11	Odisha	2	19
Delhi	–	1	Pondicherry	-	1
Daman,Div	–	1	Punjab	–	13
Goa	1	6	Rajasthan	5	25
Gujarat	4	23	Sikkim	1	7
Haryana	2	8	Tamil Nadu	5	299

[Table Contd.

Contd. Table]

State	National Parks	Wildlife Sanctuaries	State	National Parks	Wildlife Sanctuarie
Himachal Pradesh	5	28	Telangana	3	9
Jammu & Kashmir	4	15	Tripura	2	4
Jharkhand	1	11	Uttarakhand	6	7
Karnataka	5	30	Uttar Pradesh	1	25
Kerala	6	17	West Bengal	6	15
Lakshadweep	-	1			
National Status*				104	551

Number of species of different group of animals found in India has been documented in several books, which includes as per Table 3.

Table 6. Number of species in different groups

Group	*Number of Species*
Mammals	340+
Birds	1200+
Reptiles	420+
Amphibians	140+
Fishes	2000+
Insects	50,000+
Moluscs	4000+
Other invertebrates	20,000+

CHAPTER 2

TAXONOMICAL CLASSIFICATION OF WILD LIFE

The word animal is ordinarily used to warm-blooded homoiothermic furred creatures belonging to the group known as mammals. Mammals are a major group or class of animal kingdom. Their main characters are warm blood, backbone and ability to suckle the young one. The great Swedish naturalist (Carolus Linnaeus, 1707¬1778) who laid the foundation to the modern system of classification divided the class mammalia into three subclasses.

All these species are widely distributed in different biogeographic zones of the country. The important species of Indian wild animals are mentioned taxonomically here for the basic information.

MAMMALS

As mentioned in table 3 (Chapter 1), about 300 plus species of mammals under class mammalia (major three subclass; monotreme (spiny ant eater), Marsupialia (e.g.Kangaroo, koala bears) and eutheria (total 16 orders) out of them, 12 different orders have been reported in India (Prater, 1957).

CLASS - MAMMALIA
Oviparous Mammals (Egg laying)
Order : Monotremata
Duckbills and echidnas
Viviparous Mammals (Produce living young)
Pouched Mammals
Order : Marsupialia
Opossums, kangaroos, wallaroos, wallabies, tasmanian wolf, tasmanial devil, wombat koala, phalangers
PLACENTAL MAMMALS: Eutheria

The following are the orders

1. Edentata: sloths, armadillos, ant-eaters
2. Pholidota: pangolins

3. Insectivora: insect eaters
4. Lagomorpha: pikas, rabbits, hares
5. Rodentia: rodents
6. Chiroptera: bats
7. Cetacea: whales, dolphins, porpoises
8. Carnivora: dogs, weasles, lions
9. Primates: tree shrews, lemurs, monkeys, apes, man
10. Artiodactyla: pigs, camels, deer, giraffes, antelopes.
11. Perissodactyla: horses, tapirs, rhinoceroses
12. Proboscidea: elephants
13. Pinnipedia: seals, sea-lions, walrus
14. Tubulidentata: aardvark
15. Hyracoidea: hyraxes
16. Dermoptera: flying lemurs or colugos
17. Sirenia: manatees, dugong

1. **Edentata :** They have long snout and claws. E.g. sloth.
2. **Pholidata :** They do not have teeth but have a five-clawed digit. e.g. scaly ant eater (Old world) has only one genus (*Manis*). **e.g. Pangolins:** They usually prefer burrows, found in low hills and plains of India. Indian pangolin (*Manis crassicaudata)* and Chinese pangolin (*Manis pentadactyla)* are species of pangolin reported in India.
3. **Insectivores :** They are terrestrial or nocturnal creatures having small pointed teeth**.** Indian tree shrew, Himalayan tree shrew, long eared hedge hog, pale hadge hog, Indian short tailed mole, white tailed mole, grey musk shrew found in forest areas of country.
4. **Lagomorpha :** They have canine teeth, long hind legs. e.g. Hares,(Black napped, rofous tailed, desert and Himalayan mouse hare are found in India).
5. **Rodentia :** The order Rodentia comprises 32 families and 352 genera. The basic anatomical difference between lagomorpha and rodentia are 1. Os penis present in rodents, absent in lagomorphs, 2. Scrotum posterior to penis in rodents and anterior to penis in lagomorphas. Capybaras (*Hydrochoerus hydrochaeris*) of South America are the largest of rodents, being 1 to 1.3 meters in head and body length and 36 to 50 kg in body weight. In India, the major one includes flying squirrels (Kashmir wooly, large brown, Hodgkin's, grey headed, small travencore, lesser giant, large brown, parti-coloured, hairy footed etc.), giant squirrel (Indian, Malayan, grizzled), orange bellied and hoary bellied Himalayan squirrel, five, dusky, Himalayan and three striped palm squirrel, marmot, gerbil, rat, bandicoot, mouse, vole, porcupine are grouped under this categories.

6. **Chiroptara :** Bats are only mammals capable of true flight. The major species of bats found in India are flying fox, fruit bat, Indian false vampire, Great eastern horse shoe bat, serotine, Indian pipistrelle, short nose fruit bats, common yellow bat, tickells bat, and painted bat are some of bats well distributed in many part of country.
7. **Cetacea :** see marine mammals.
8. **Carnivora :** They are terrestrial, aquatic or arboreal. The major felidae and canidae under this order includes (I). **Felines:** Includes Asiatic lions, tiger, leopard or panther, snow leopard, clouded leopard, caracal, lynx, pallas cat, fishing cat, leopard cat, jungle cat, desert cat. (II).**Civets:** They live in and around the dense jungles. Large Indian civet, small Indian civet, common palm civet, bear civet (Binturong), tiger civet are some of the examples of civets of India. (III). **Mongoose:** Mongooses are well distributed from Kashmir to Kanyakumari, The other species includes small Indian, striped necked, crab eating and brown mongoose. (IV**). Pandas**: red panda live in the temperate forests of central and eastern Himalaya. They are nocturnal. (V). **Bears**: They are distributed from Himalaya to Kanyakumari. Major bears of India include sloth bear, brown bear and Himalayan black bear. They come under Ursidae family. (VI).**Hyaenas**: they are the scavengers of forest. Striped hyena found all over India. (VII).**Canines**: Wolf, jackal, foxes (Red, Indian, Hill, White footed), dhole (Indian wild dog) are well distributed in several part of India. (VIII). **Weasel**; Otter (Common, Smooth Indian, claw - less), marten (stone, yellow throated, nilgiri), badger (Chinese, Burmese, Hog, honey), weasel (Himalayan, pale, yellow bellied, striped back) are some of the examples of these family.
9. **Primates :** The order primate comprises of 11 families and 60 genera. Indian monkeys are belongs to two subfamily of **cercopithecidae** family. The **cercopithecinae** (macaques) and **Colobinae** (langurs). Major species of primates which are found in India are hoolock gibbon or white browed gibbon (north-east), bonnet macaque (Indian peninsula), rhesus macaque (north-east, northern, central India), assamese macaque (foot hill of Himalayas, north-east, sundarban delta), stump-tailed and pig tail macaque (north -eat), lion -tailed macaque (western ghat), common langur (common in India), capped langur (north-east), golden langur (Indo-Bhutan border), nilgiri langur (western ghat), slow loris (north-east) and slender loris (South India).
10. **Artiodactyla :** This diverse order contains all even-toed hoofed mammals, including the swine, peccaries, hippopotamuses and ruminants. Families of ruminants of world with in Artiodactyla includes camelidae, tragulidae (mouse deer), cervidae (true deer), giraffidae (giraffes and okapi), antilocapridae and bovidae (wild buffaloes, bison, wild goats and sheep). The bovidae differs from cervides on the following points..1. *Upper canines* are not present in bovides where as it is present in cervides, 2. *Gall bladder*; bovides posses gall bladder, where is it is absent in all cervides except musk deer. The major species of India includes (a). **Pigs:** Usually found almost all over the country, they prefer to live in grasslands, scrub forest and at times dense forest

also. Viz. Indian wild boar and pigmy hog.(b**). Antelopes**: Chiru, chinkara, black buck, chawsingha and nilgai or blue bull are examples of antelopes found in India. (c). **Deer**: Out of 53 species of deer in world, Indian chevrotain (Mouse deer), musk deer, barking deer, cheetal (spotted deer), hog deer, sambhar, barasingha (swamp deer),thamin (brow antlered deer) and hungul (Kashmir stag) are the native deer species of our country. The sambhar is taller and larger deer. (d). **Bovidae**: Several groups of bovine includes Gaur or Indian bison, bentang, yak, wild buffaloes, urial, nayan, bharal, ibex, markhor, tahr (Himalayan, nilgiri), serow, goral, takin are goat - antelopes.

11. **Perissodactyla :** Perissodactyla is a diverse order containing odd toed hoofed mammals (Burton, 1962). Major wild equine species of India includes Asiatic wild ass of little rann of Kutchh in Gujarat, Tibetan wild ass of trans - Himalayan cold desert and great Indian one horned rhinoceros of swampy wet land areas of north east India.
12. **Proboscida :** Indian elephant (*Elephas maximus*) is relatively smaller than the African elephant (*Loxodonta africans*) along with other several distinguishing features. In past it was distributed in many parts of our country but at present its distribution is confined to Himalayan foot hills, bihar, up, W.Bengal, north east India, orrisa, western ghat and south of Mysore.The great Indian rhinocerous also supports the biodiversity of India.

MARINE MAMMALS

The Cetacea (whale, dolphins and porpoises), Sirenia (sea cows) and Pinnipedia (seals, sea lions and walruses), pinnipedia are not found in Indian seas. Of the eastern and western coastal area of our country Blue whale, finner whale, sea whale, hump backed whale, sperm whale, pigmy sperm hale, common dolphin, red sea bottle nosed dolphine, little Indian porpoise, dugong (sea cow), gangetic dolphine are some of the examples of biodiversity of marine.

BIRDS

In India, 1200 plus species of birds have been documented, which comprises of major 20 orders listed in our country. Most of the birds have keels for attachments of flight muscles known as carinates, but is absent in ratites (Kiwis, ostriches, rheas, cassowaries and emus).

REPTILES

They are poikilotherms, largely oviparous and mostly aquatic in habit. In western countries they are now commonly kept as pets (turtle, terrapins, iguanas, lizards, chameleons, snakes, alligators, geckos, crocodiles). Temperature, humidity, light and variety of food are imporant factors in their life.

The major orders includes chelonia (turtle, tortoises, terrapins), crocodilia (crocodiles, gharials) and squamata, having suborder of serpentes or ophidia and lacertlia (lizards). The important venomous snakes are cobra, Russell's viper, krait and saw scaled viper.

FISHES

In India fishes occur in the rivers, streams, swamps, marshes, lakes and marine habitats from cold Kashmir to Indian Ocean. The major ones include are katla, mirgala, trout, labeo etc. The management includes hygiene, temeperature, pH and O_2 concentration of water.

CHAPTER 3

BIOLOGICAL FEATURES OF WILD ANIMALS

The classifications of the mammals into different groups indicate their relationship with each other genealogically. Their capacity to adapt to their environment is most important. The environment includes the surroundings, the conditions that influence the body forms and the habitat of the animal that it supports. It is characterised most easily by the vegetation. In an enlarged definition environment includes both physical or abiotic and living or biotic environment. The abiotic environment includes the medium of life and the climate. This medium and the climatic conditions regulate and considerably affect the behaviour of the organism. Climatic conditions like the temperature, rainfall, day length, soil, topography all exert influence.

STATUS OF WILD ANIMALS

The wild animals according to their population and habitat, as specified by International Union of Nature and Natural resources (IUCN), based red data book are categories as

(a) extinct (no reasonable doubt that its last individual has died),

(b) extinct in the wild (survive in captivity),

(c) critically endangered (facing extremely high risk of extinction in the wild in the immediate future),

(d) endangered (it is not critically endangered but is facing a high risk of extinction in the wild in the near future),

(e) vulnerable (is facing a high risk of extinction in the wild in the medium term future),

(f) conservation dependent , low risk data deficient and not evaluated.

Salient Features

(a) Prototheria, (Gr. Pratos, first, ther, wild beast), as the name indicates, they are the most primitive of the mammals. Prototheria has only one order the Monotremata (Gr. monos, single, trema atos, a hole). This is the lowest order of mammals having a single opening for both the genital and the digestive organs.

(b) Monotremata is represented by the echidnas (spiny ant-eater) and the duck-billed platypus. They show some reptilian characters and are egg layers. When the young ones hatch the mother suckles them. The milk glands do not have a teat or nipple. The milk exudes from the pores on the skin that are the forerunners of the nipple.

(c) Marsupialia or pouched mammals, represent a further development stage of mammalian evolution. They belong to metatheria. The young ones are born in a very immature stage and find their way into the mother's pouch and remain there until the development is complete. The pouch contains teats for suckling. This order includes kangaroos, wombats, wallabies, opossums and pouched mice.

(d) The Eutheria (Gr. eu, well, ther, beast) includes the placental mammals. As the name indicates they are in the most advanced stage in evolutionary terms. The young ones are retained in the uterus till they reach an advanced stage of development. Placenta provides the nutrition and the oxygen. Placental mammals are considered as success in the evolutionary ladder and reflect diversity and have no less than nineteen orders.

(e) Order Insectivora comprises of small primitive creatures like hedgehogs, shrews and moles. They feed mostly on insects.

(f) Chiroptera (Gr. cheir, hand, pteron, wing) popularly known as bats, are either insect eaters or fruit eaters.

(g) The order Dermoptera ("winged skin") has only two species, the flying lemurs and they are leaf eaters.

(h) Primates are characterised by their ability to grab the objects. They may grab the objects with hand, legs and even with tail. E.g., monkeys of the new world. Their diets are usually mixed: The monkeys, apes, lemurs and human beings and possibly the tree shrews are all primates.

(i) The sloths, armadillos and termite eating ant-eaters, make up the order Edentata. They are seen in Central and South America.

(j) Pholidota, which are known, as pangolins are similar in many ways to armadillos but unrelated and are seen in Africa and Asia.

(k) Rabbits, hares and pikas are considered as rodents and included in Lagomorpha and are mainly herbivores.

(l) Rodentia consists of gnawing animals and is the largest of all the mammalian orders. They include a great variety of animals like mice, rats, guinea pigs, hamsters, porcupines, squirrels and beavers.

(m) Carnivora as the name indicates are flesh-eating animals. They are endowed with claws and the common carnivores are dogs, cats, lion, leopard, tiger, weasels, badgers otters and bears. The aardvark, which is a termite eater, is quite distinct in its anatomy and hence given an order onts own, Tubulidentata.

(n) The elephants both Asian and African with their distinctive trunk and tusk are included in the order Proboscidea. Rock climbing hyrax, once closely related to the elephants is placed in a separate order of its own.

(o) The hoofed animals that are known as ungulates are herbivores.

(p) Those with odd number of toes come under Perissodactyla (Gr. perissos, odd, daktylos, finger/toe). They include the horses, tapirs and rhinoceroses.

(q) The rest of the large herbivores are even toed and called Artiodactyla.(toes; even in number). It includes the cattle, sheep, deer, antelopes, pigs, giraffes, camels, hippopotami and goats.

(r) Sea mammals belong to three marine orders, Pinnipedia (Seals, Sea-lions and Walruses), Cetacea (Whales, Dolphins and Porpoises) and Sirenia (Dugongs and Manatees). They show considerable adaptation to the aquatic habitat.

ORDER PHOLIDOTA

Pangolins or Scaly Ant-eaters of the old world belong to the order Pholidota with only one genus, Manis. Formerly they were classed under Edentata, meaning without teeth. They are seen in Africa and Southeast Asia and have pointed heads with small eyes, long and broad tail, long tongue and no teeth.

ORDER INSECTIVORA

Insectivores are the most primitive placental mammals. 345 species are recognised. They have small narrow pointed snout and eat insects and other invertebrates. They include the Tree Shrews, Hedgehogs, Moles and Ground Shrews. As the name indicates Tree Shrews climb the trees. Moles are adapted for living and finding their food from underground. Hedgehogs and Ground Shrews are mostly terrestrial. Common species found in India are

Indian Tree Shrew (*Anathana ellioti*) Malay Tree Shrew (*Tupaia glis*)
Long Eared Hedgehog (*Hemiechinus auritus*) Eastern Mole (*Talpa micrura*)
Grey Musk Shrew (*Suncus murinus*) .

ORDER CHIROPTERA

It has 951 species. The name is derived from cheir meaning hand and pteron meaning wing. They are the only mammals capable of sustained flight. Usually they rest with their head hanging down. Bats in cold climates are found to hibernate. They are nocturnal and live on night flying insects. Sub-order megachiroptera include all frugivorous bats and that of microchiroptera eat insects. Some bats eat fish, frogs, birds and even other bats. Bats use echolocation to detect their prey and to sense obstacles. Echolocation means the perception of the objects using reflected sound waves, usually high frequency sounds. They use it for orientation and prey location. Their nose and ears are complex in shape. Fruit bats or Flying foxes eat fruits and leaves, food is detected by smell. They are the largest of the bats and have large eyes and dog like head, small ears and a long muzzle. They have better vision than other bats and few use echolocation. Nearly a quarter of the living mammals belong to the group of bats.

The species found in India are Flying Fox (*Pteropus giganteus*), Fulvous Fruit Bat (*Rousettus leschenaulti*), Short Nosed Fruit Bat (*Cynopterussphinx*), Bearded Sheath Tailed Bat (*Taphozous melanopogon*), Indian False Vampire (*Megaderma lyra*), Great Eastern Horse Shoe Bat (*Rhinolophus luctus*), Common Yellow Bat (*Scotophilus heathi*) and Painted Bat (*Kerivoula picta*).

ORDER PRIMATES

Primates are the highest order of mammals, including lemurs, monkeys, anthropid apes and man. This classification probably gives a pride of place for man in the animal kingdom. Physiologically there is nothing superior in primates when compared to the other living organisms. We can call it superior development of the brain and associated higher intelligence. However, intelligence wise lemurs and some monkeys are not much better than some of the lower mammals.

The major distinctive character in primates is the structure of their hands and feet. They are designed with the purpose of grasping objects. This is an adaptation to the particular habits and mode of life of these creatures. The hands of apes, monkeys and lemurs are similar to human beings, but the thumb is opposable to the other fingers. This helps the primates to hand pick and hold objects. Unlike man, hands are their primary organs of locomotion for tree climbing and arboreal movements. Many apes have no thumb at all and in some they are small and useless. This adaptation helps in rapid movement, quick hooking and instant release. Quick progression through the branches may injure a protruded thumb. However unlike apes and monkeys, all lemurs have well developed thumbs and in some, the index finger is poorly developed. Double bones in the fore arm, which are equally developed and free, provide perfect movement for the wrist. The wrist can be turned upward, downward and rotated. The foot is provided with the same facility. The feet of primates have almost the same design as that of hand. The toes are long and flexible. The big toe is highly developed like the thumb and can oppose the other digits for grasping objects. In man the grasping power of feet is lost. Gibbon has an extensively long arm, powerful chest and shoulders and a weak hindquarter, which is well adapted to its type of progression through the trees. In langur arms are not excessively long, legs are longer than the arms and loins and thighs are well developed. They move fast, springing from one branch to another and from tree to tree.

Tail helps them to balance while moving in leaps and bounds. Tails have a variable feature in different primates. In the new world monkeys they are used as an organ of prehension. Apes have no tail and they maintain balance with the help of outstretched arms.

While walking on the ground, or along a branch, gibbon walk erect on the soles of the feet and keep balance with stretched arms. Langurs and monkeys walk and run like any other quadrupeds similar to dogs. The whole palm is pressed to the ground, but not the entire sole, the heel is raised above the surface. Monkeys in general are good swimmers, especially macaques. They swim vigorously in breaststroke style.

Apes, monkeys and lemurs eat, flowers, leaves and fruits. The teeth of these herbivores can grind tough vegetable matter. Most lemurs thrust out their snout for food. Apes and monkeys use hands as prehensile organs to take food to the mouth. Some have large pouch in their cheeks to which they cram food that they cannot immediately eat. They continue to eat even when the pouch is full. Baboons and macaques possess these pouches, but it is not seen in langurs. Stomach of langur is compartmentalised into three pouches, somewhat similar to ruminants. While langurs are herbivores and macaques are omnivores, they eat grubs, spiders and insects. Some even eat lizards and frogs and one of the tribes even eat crabs. Lemurs are nocturnal, but monkeys feed only during the day. They get along very well with other animals. Some ungulates prefer to forage underneath the trees on which monkeys are feeding. Monkeys at times will drop wastefully and intentionally fruits and leaves. Ungulates feeding on the ground in turn eat them.

Main predators of monkeys apart from man are large cats, especially the panther, large snakes and crocodiles. They escape from the predators with well-developed vision, hearing, extreme alertness and agility. Hiding behind the natural cover or concealment by deliberately drawing branches together is a common habit. Most common impulse is escaping by fleeing from danger. Interestingly sometimes they slide down to escape from the predator. Why these arboreal animals come down exposing themselves more to danger and sometimes get killed is yet to be explained. They get protection by living in collective groups, the troop. A threatened attack on any member of the troop draws aggressive reaction from other members. Alarm calls of langurs and macaques, when a large cat is on the prowl are famous. The hunters often notice this for the presence of a tiger or a leopard. An alarm call from anyone of the troop members will send the entire members to bolt without even finding out the reason for the threat. They never use tools in self-defence or to attack animals. They fight to protect themselves or their young ones or to establish dominance over other males for females. The monkeys usually live in the tropical climate; however some langurs and some like Assamese macaques have extended territories in the very cold regions of Himalayas. They are adapted with special winter coats for this purpose. Seasonal movements are influenced by the availability for food.

Monkeys cannot talk, not for want of intelligence but because of the anatomical peculiarity of their voice box. Many birds are capable of imitating human words. They vocalise several communications like pleasure, anger, fear, warning and calls to come together and show distinct facial expressions corresponding to different emotions.

Fur picking is not like the popular belief for hunting lice or ticks.

It is universal and is a form of amotive caress or courtship. Repeated indulgence in fur picking suggests a powerful bond and means of social communication between the members of the troop.

Each troop does not range all over the habitat, but often confine to a specific territory. They may marginally overlap and fight for territory. This is rare in the wild. In urban

environment, it is very much seen, often due to the shortage of food. Rhesus monkey is the common example for this type of behaviour. Males dominate the troop and are ranked in a linear manner similar to the pecking order in poultry. Different sub-groups in a certain tribe are established.

All primates give birth to their young ones singly. Immediately after birth the young one cling to its mother's body sucking her teat. It is able to hold fast on to the mother even during quick movements and jumps. While sitting, the mother supports the young one by holding the baby with its arms. Long tailed lemur supports its baby to her body with her tail. When the baby is grown up to crawl on its own, it is carried on the back of the mother. A similar method of carrying the young ones is seen in bats, sloth and armadillos. Needless to say, marsupials carry the young ones in their pouch. Apes and monkeys suckle their young ones for a long time. A baby gibbon is suckled for nearly two years. The mothers do not ordinarily gather food for the young ones. It is interesting to note that the intelligent animals look after the young ones for a considerably longer period of time and have long period of maturity. Great apes and bigger monkeys take anything from six to twelve years for mental development and to become independent. Smaller monkeys take 3-5 years and little lemurs that are physically smaller but with poorly developed intelligence take only two to three years to achieve full-grown status. It is reasoned that intelligent animals take longer period to reach adulthood, because they have to learn the trick of the trade of the adult intelligent world.

A dominant monkey takes tremendous risks to protect its followers. A nursing mother protects the young ones even at the cost of her life. It is noteworthy that a mother continues to carry the dead body of the young one in some instances. This may be due to the fact that it is not able to recognise death and carry around the young one purely on an instinct Indian Primates.

There are apes, monkeys and lemurs in India. None of the great apes are seen in India. Gorilla and Chimpanzee are seen in Africa and Orang-utan in the forests of Borneo and Sumatra. Hoolock Gibbon is the only tribe of ape seen in India in the forests of Assam and Chittagong. As mentioned earlier they are tail-less with well-developed arms that are longer than the legs. Indian monkeys belong to one Family viz. Cercopithecidae and two sub-families Cercopithecinae (Macaques) and Colobinae (Langurs). Macaques are sturdy solid and squat, while the langurs are slim and with long tail. Macaques have cheek pouch while the langurs have a pouched stomach. Among lemurs, only one Family is found in India the Lorisidae or the Lorises.

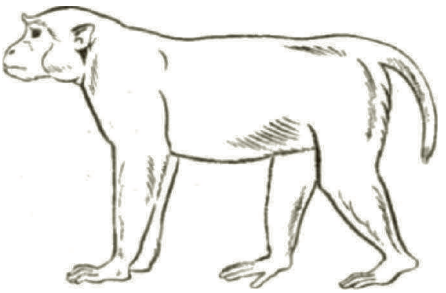
Hoolock Gibbon (***Hylobates hoolock***) Males are black in colour with white eyebrows. Females are brown. They feed on fruits, leaves and also on insect grubs and spiders. They travel along the top galleries of forest foliage and live in small groups. Young ones are covered with yellow tinted greyish white hair. They stand erect and are more than one metre in height and weigh 6.8 kg on an average.

Langur Lori Gibbon Macaque

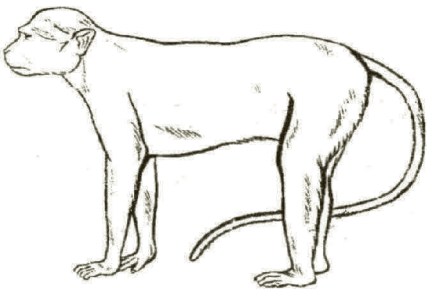
New world Old world

Primate Groups of South Asia

Among macaques, Rhesus Macaque ***(Macaca mulatta)*** and Bonnet Monkey ***(Macaca radiata)*** are common. The human blood group classification is based on studies on rhesus monkey. They are common in North and Central India. Bonnet monkey has a longer tail compared to that of Rhesus. The temple monkeys of south India are bonnet monkeys and are seen very commonly.



Rhesus Macaque



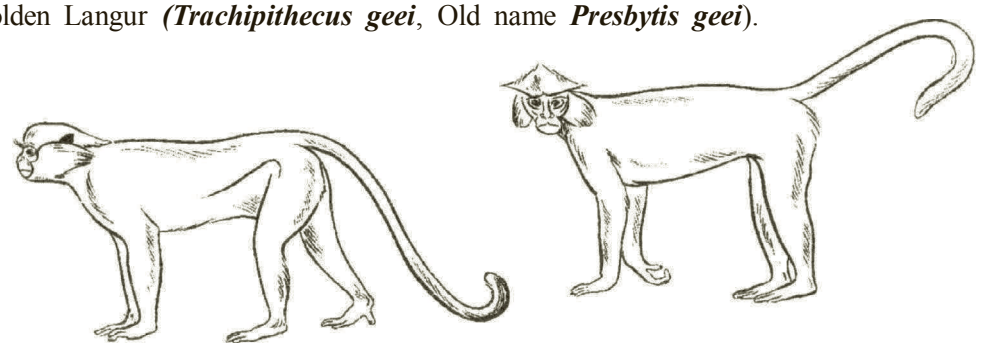
Bonnet Macaque

Other group of monkeys are langurs. Common Langur ***(Semnopithecus entel1us***, Old name ***Presbytis entel1us)*** is distributed all over India and worshipped as Hanuman of Ramayana. However for some people Hanuman is from Deccan and should be Bonnet monkey.

Lion Tailed Macaque ***(Macaca silenus)*** is found only in Kerala, Tamil Nadu and Karnataka. It is endangered and protected in the Silent Valley National Park. It eats lizards, snakes, and insects and also fruits and leaves. Assamese Macaque ***(Macaca assamensis***), Stump Tailed Macaque ***(Macaca speciosa)*** and Pig Tailed Macaque ***(Macaca nemestrina)***.

Other langurs are, Nilgiri Langur (***Trachypithecus johni***, Old name ***Presbytis johni***) as the name implies is seen in Nilgiris in Kerala, Tamil Nadu and Karnataka, Capped

Langur or Leaf Monkey (***Trachypithecus pileatus***, Old name ***Presbytis pileatus***) and Golden Langur ***(Trachipithecus geei***, Old name ***Presbytis geei***).



Golden langur **Capped langur**

The golden *langur,* is endemic to north-east India. The species was discovered in 1955-56. It is confined to a small area of reserve forest between the Manas and Sankosh river along the foot of Bhutan Himalayas. On the north its range further extends into the central Bhutan region. The surviving population of the species comprises around 1,000 individuals, living in herbs of 7 to 15. The species is threatened mainly due to destruction of habitat. Golden *Langur* are distributed in various parts of India. Data of various sanctuaries reveal that they cover total 2, 18,229: Ripu = 60,529, Kachugaon = 21,446, Chirang = 59,254, Manas = 77,000. The body coat of golden *langur* looks uniform deep cream in dull light. The species is endangered due to indiscriminate felling of the trees in the forests of North Assam and north-eastern States has caused the monkeys homeless and subsequently perished in large numbers. Golden langur bas been included in Schedule I (the Entry 10) of the Wildlife (Protection) Act,1972 and also in Appendix I of the CITES.

EXOTIC APES

Apes are anthropoid primates and comprises of lesser apes (Gibbon) and great apes (Orang-utan, Gorilla and Chimpanzee). They differ from the monkeys in not having a tail and in using their arms to swing through the trees.

Orang-utan (*Pango pygmaeus*) is native to forests of Sumatra and Borneo. Height measures about 1.5 m and weighs about 90 kg. Body is covered with sparse long shaggy red brown hair. The arm span is up to 2.25m. In adult males large naked fatty folds form a collar around the face. It is the largest anthropoid ape of Asia. Legs are short and bowed, with knees turned out and feet in. Feeds mainly on the fruits and buds of plants.

Gorilla ***(Gorilla gorilla)*** There are two varieties, the low land one of West Africa and Cameroon and the mountain variety of the Eastern Congo Basin. Gorilla is the largest primate and grows to a height up to 1.8 metres, weighs about 200 kg and has a massive and muscular body. Usually walks on all fours. Adult males have a marked crest and are black except in old males (Silver blacks), which have a silvery grey torso. Gorilla roams the forest during the day in small family groups for fruits and plants and spends the night on the trees.