

- * Kingdom: Animalia Animals: not plants, fungi, bacteria, or protozoans
- Phylum: Chordata Chordates: animals with a notochord (Total 30 phylum)
- Subphylum (Group):
 - ✓ Vertebrates : Animals with bony spines
 - ✓ Non Vertebrates :
 - > Vertebrates : Two super class
 - 1. Pisces: The class of fish
 - 2. Tetrapoda: Four class
 - ✓ Amphibia
 - ✓ Reptilia
 - ✓ Aves
 - ✓ Mammalia

- Class: Amphibia: 140 + species, Living on water & land both,
 e.g. Frog, Salamendar Heat loving reptiles at one time supposed to live in fire
- Class: Reptilia: 420+ species

Two subclass

- 1. Anapsida: Tortoise, Turtle, Terrapines
- 2. Diapsida: Lizard, Snakes

Diapsida: Three order

- 1. Ophidia: e.g. Snakes
- 2. Crucodelia: e.g. Crocodile, Ghariyal
- 3. Squamata: e.g. Lizard

Order: Ophidia - Character

- ✓ Horny scale,
- ✓ Cold blooded
- ✓ Oviparous
- ✓ No ears & Legs
- ✓ Jaws flexible & boneless
- ✓ Eyelids Immovable
- ✓ Bifid sensory organ Tongue two division
- ✓ Salivary gland modified to poisonous gland
- ✓ Urinary bladder absent
- ✓ Male double spiny penis
- ✓ Female Cloaca
- ✓ Locomotion: Ribs, Sliding
- ✓ No chewing of food , only swallowing
- ✓ Two teeth in upper jaw are hollow in nature & k.a. Dong through which bite takes place

- Class : Aves
- ✓ In India, 1200 plus species of birds have been documented which comprise of major 20 orders
- ✓ Warm blooded
- ✓ Oviparous
- ✓ Fore leg converted in to wing
- **✓** Feathers are modification of skin
- ✓ Hollow bone : air sacs
- ✓ Specialised structure for flight k. a. Keel or Carinates but absent in ratites (Kiwi, Ostriches, Emus)

Class: Mammalia –about 300 plus species of Mammals

Evolved from reptiles nearly 220-180 million years ago and are considered to be the most successful group of animals on earth.

- ✓ Secrete milk to feed young ones.
- Unlike in higher mammals where milk is secreted through nipples or teats, in platypus and echidna, milk is secreted over the skin and drains over tuft of hairs.
- Kangaroos are known to produce milk with different composition at a time since they suckle two young ones on different age groups at a time. Nipple suckled by the older joey secretes milk with 20 per cent fat and the newborn joey is suckled fat free milk.

- ✓ Hair over the body
- ✓ Unique jaw structure

In reptiles lower jaw is made of several bones, whereas in mammals, it is made of a single bone and is attached to the skull by a hinge like joint. Teeth of mammals are also unique which help them to feed on different type of materials.

- **✓** Warm blood maintain a constant body temperature
- ✓ Larger brains in relation to body size help to adapt better to different climatic and environmental situations.
- > Three Sub class
 - 1. Protheria 2. Marsupialia 3. Eutheria

- Sub Class: Protheria
 - **✓** Most primitive of Mammals
 - ✓ Oviparous mammals (egg laying)
- Only one Order: Monotremata
 - **✓** Lowest order of mammals
 - ✓ Single opening for genital & digestive organ
 - ✓ e.g. Echidnas (spiny ant-eater), duck-biled platypus which are unique to Australia.
 - ✓ Platypus and echidna are egg-laying mammals.

 Their young ones hatch out from eggs by slit opening the eggshell with a specialized organ called the eggtooth.

- > Sub Class: Marsupialia
- ✓ Viviparous mammals (produce living young)
- ✓ Pouched mammals Young ones are born in a very immature stage & find their way into mother's pouch & remain until the development is complete.
- ✓ e.g. Kangaroos, Koala bears

Koala bears



- > Sub Class: Eutheria
- ✓ Placental mammals
- ✓ Most advance stage in evolutionary terms
- ✓ Young ones are retained in the uterus till they reach an advance stage of development
- ✓ Placenta provides nutrition & oxygen
- ✓ Total 16 orders Out of them 12 different orders have been reported in India

The following are order

- ✓ Edentata sloths, armadillos, ant eaters
- **✓** Pholidota pangolins
- ✓ Insectivora insect eaters
- ✓ Lagomorpha pikas, rabbits
- ✓ Rodentia rodents
- **✓** Chiroptera- bats
- ✓ Cetacea whales, dolphins
- ✓ Carnivora dogs, lions
- ✓ Primates monkeys, apes, man
- ✓ Artiodactyla pigs, camels, deer, giraffes, antelopes
- **✓** Perissodactyla horses, rhinoceroses
- **✓** Proboscidea elephants
- ✓ Pinnipedia seals, sea lions
- ✓ Tubulidentata aardvark
- ✓ Hyracoidea hyraxes
- **✓** Dermoptera flying lemurs or colugos

1. Edentata

- ✓ Meaning without teeth
- ✓ Having long snout and claws
- ✓ Seen in Central and South America e.g. sloth

2. Pholidota

- ✓ Formerly they were classed under Edentata
- ✓ Do not have teeth but have a five clawed digit
- ✓ Seen in Africa and Southeast Asia
- ✓ Feed on termites and ants
- ✓ Body is covered with large overlapping plates and hence, known as Scaly Anteater
- ✓ e.g. Pangolins usually prefer burrows, found in low hills & plains of India.
- ✓ Two species reported in India –
- ✓ Indian pangolin & Chinese pangolin Seen in Assam



Pangolin

Ant – eaters



3. Insectivores

- ✓ Most primitive placental mammals.
- ✓ 345 species are recognized.
- ✓ Terrestrial or nocturnal creatures having small pointed teeth and eat insects and other invertebrates.
- e.g. Indian tree shrew, Himalayan tree shrew, Long eared hedge hog, Pale hadge hog, Indian short tailed mole, Grey musk shrew found in forest area of country.

4. Lagomorpha

- ✓ 58 species and virtually worldwide in distribution.
- **✓** Have canine teeth, long hind leg, e.g. Hares, Rabbits
- ✓ Indian Hare is generally found in open bush country.
- ✓ Mostly nocturnal and their main enemies are foxes, mongooses, wild cats and even stray dogs.



Indian tree shrew

Hares



5. Rodentia

- ✓ Comprise of 32 families & 352 genera
- ✓ Basic anatomical difference between Lagomorpha & Rodentia —
- ✓ Os penis present in Rodents, absent in Lagormopha
- ✓ Scrotum posterior to penis in rodents & anterior in Lagormopha
- ✓ In India major one Flying squirrels, Giant squirrels, Rat, Mouse, Porcupine grouped in this categories.
- ✓ Flying squirrels Mostly arboreal and some of them glide through the air.
- ✓ Limbs connected by a membrane and this acts as a parachute; by the outstretching of the limbs to the maximum extent possible.
- ✓ From very tall trees it can glide upto 100 meters.

- ✓ Indian Porcupine commonly seen in India and Sri Lanka.
- ✓ Red Porcupine is a colour phase of Indian porcupine seen in southern India.
- 6. Chiroptara
- ✓ 951 species. The name is derived from *cheir* means hand and *pteron* means wing
- ✓ Bats are only mammals capable of true flight.
- ✓ In cold climates are found to hibernate
- ✓ Nocturnal and live on night flying insects.
- ✓ Use echolocation to detect their prey and to sense obstacles. Use it for orientation and prey location.
- ✓ Major species found in India flying fox, fruit bat. Indian false vampire, common yellow bat, tickells bat & painted bat distributed in many parts of country.



Flying squirrels

Porcupine



7. Cetacea

- ✓ Marine mammals
- ✓ Cetacea (Whale, Dolphins), Sirenia (Sea cows) and Pinnipedia (Sea lions)
- ✓ Pinnipedia not found in Indian seas.
- ✓ Eastern & Western costal area of country Blue whale, Sea whale.

8. Carnivora

- ✓ Terrestrial, aquatic or arboreal
- ✓ Major felidae & canidae under this order includes
- 1. Felines: Includes Asiatic lions, tiger, leopard or panther, snow leopard, fishing cat, leopard cat, jungle cat, desert cat
- 2. Civets: Live in & around the dense jungle. e.g. Large Indian civets, Small Indian civets, Tiger civet



Pinnipedia

Sirenia (sea cows)



- 3. Mongoose: well distributed from Kashmir to Kanyakumari. e.g. Small Indian, Crab eating & brown mongoose.
- 4. Pandas: Red panda live in the temperate forests of central & eastern himalaya & they are nocturnal.
- 5. Bears: well distributed from Kashmir to Kanyakumari. Major bears of India include Sloth bear, Brown bear & Himalayan black bear.
- 6. Hyaenas: Scavengers of forest, flesh eating wild animal e.g. Striped hyena found all over India.
- 7. Canines: Wolf, Jackal, Foxes, Dhole (Indian wild dog) well distributed in several parts of India.
- 8. Weasel: A small red brown animal living on birds, rats, frogs, etc.



Civets

Mongoose





Hyaenas

Dhole (Indian wild dog)



Felines

- ✓ Tiger (Panthera tigris) Extensive hunting has reduced the tiger population almost to the verge of extinction.
- ✓ Hence the Government of India and WWF started the Project Tiger in the year 1973.
- ✓ Average weight of males varies between 180-230 kg and females weigh Tiger 45-50 kg less.
- ✓ Tigers found in cold climates are usually heavier compared to those found in the hot climate.
- ✓ Gestation period is 105-112 days. Litter size is between 2-3, age of maturity is three years for females and four years for males.
- ✓ Longevity is about 20 years.

- ✓ Lion (Panthera leo) lives in a pride and probably it is the only cat that hunts in a group, consisting mostly of females.
- ✓ Tigers and lions are usually not seen in the same jungle, even though leopards are found.
- ✓ No specific breeding season. In Gir many lions mate between October and November and cubs are born in January and February.
- ✓ Gestation period is 105-112 days. The litter size is about
 2-5 cubs and they are often blind for the first 6 days.
- ✓ First litter is born when the lioness is 2.5 to 3 years old. A lion is considered to be in his prime when it is 5 years old.

- ✓ Leopard or Panther (Panthera pardus) is a small carnivore compared to the lion and the tiger.
- ✓ Leopard probably fills the niche between the two super predators.
- ✓ Found both in Asia and Africa.
- ✓ Although smaller in size, it is more dangerous compared to the other carnivores.
- ✓ When it makes a kill, it drags the prey upon a tree away from the scavengers.
- ✓ Average weight is 50 kg for males and 40 kg for females.
- ✓ Fur is generally deep yellow in colour with dark spots or rosettes and under parts are white.
- ✓ Black panther is a condition of melanism.
- ✓ Panthers breed year round producing the first litter at 2.5-4 years of age. Average litter size is two and gestation period of 87-94 days.

Civets

- ✓ 17 species, mostly Asian.
- ✓ Also known as civet cat or bush dog.
- ✓ They are omnivorous.
- ✓ Well developed eyesight, sharp and acute sense of smell and hearing.
- ✓ Whiskers can be switched backward and forward and are used to sense food.
- ✓ Main habitats are rainforest, woody grasslands and seen from sea level up to an altitude of 2000 m.

Hyena

- Nocturnal, stocky, dog like animal with short back legs, large head with strong jaws, and inhabits the plains of southwest Asia and Africa.
- ✓ Animal walks on the toes, four on each foot.
- ✓ Jaws are extremely powerful and feeds on the carrion (dead animals) left by other predators, but will also kill ungulates.
- ✓ The share that hyenas get is often bones and coarse remains.
- ✓ Powerful jaws and large teeth are very well adapted to crush the bones.

- > Dhole or Indian Wild Dog (Cuon alpinus) is widely distributed in India and looks very much like the domestic dog.
- ✓ Dentition is different from the wolves, domestic dogs and jackal.
- ✓ It has 12-14 teats while the domestic dog has only ten teats.
- ✓ Dholes do not bark, but yap or utter excited whimper when in sight of their prey.
- ✓ Vocalise with peculiar whistling sound and hunt in packs.
- ✓ Dholes get along well with domestic dogs and even mate with them.
- ✓ Gestation period is 60-63 days in wolves, jackals and domestic dogs, 70 days in wild dog and 51-53 days in case of fox.

9. Primates

- ✓ Comprise of 11 families & 60 genera.
- ✓ Apes, Monkeys and Lemurs in India.
- ✓ Gorilla and Chimpanzee seen in Africa.
- **✓** Orangutan 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.
- ✓ Indian monkeys belongs to family Cercoppetticidae
- ✓ Two subfamily : Cercopitticinae (e.g. Macaques) & Colobinae (e.g. Langurs)
- ✓ Macaques are sturdy solid and squat
- ✓ Langurs are slim and have long tail.
- ✓ Macaques have cheek pouch while the langurs have a pouched stomach.
- ✓ Among lemurs, only one family is found in India i.e., the Lorisidae or the Lorises.

- ✓ Among macaques, Rhesus Macaque (Macaca mulatta) and Bonnet Monkey (Macaca radiata) are the common species.
- ✓ Human blood group classification is based on studies on rhesus monkey.
- ✓ Present in North and Central India.
- ✓ Bonnet monkey has a longer tail compared to that of Rhesus.
- ✓ Temple monkeys of south India are bonnet monkeys and are commonly seen.
- ✓ Lion Tailed Macaque is found only in Kerala, Tamil Nadu and Karnataka.
- ✓ Endangered and protected in the Silent Valley National Park.
- ✓ Eats lizards, snakes, and insects and also fruits and leaves.
- ✓ Assamese Macaque, *Stump* Tailed Macaque *and Pig Tail* Macaque.

Other group of monkeys are langurs

- ✓ Common Langur is distributed all over India and worshipped as Hanuman of Ramayana.
- ✓ However for some people Hanuman is from Deccan and should be Bonnet monkey.
- ✓ Other langurs are, Nilgiri Langur seen in Nilgiris in Kerala, Tamil Nadu and Karnataka.
- ✓ Golden Langur

Among lemurs - two types seen in India are

- ✓ Slow Loris and Slender Loris
- ✓ Large eyes
- ✓ Slender Loris is seen in south India
- ✓ Slow Loris in northeastern India and is on the verge of extinction.

Exotic Apes

- ✓ Chimpanzee is native to equatorial Africa, and they are believed to be the closest living relatives to human beings.
- ✓ They are territorial and feed on plants and insects and use small twigs to get food.
- ✓ Two species are identified; Chimpanzee (Pan troglodytes) and the smaller black faced Pigmy Chimpanzee or Bonobo (Pan paniscus).
- ✓ Produce single off springs at birth, may live up to an age of 35 years and are the most intelligent of apes.
- ✓ Gorilla
- **✓** Orangutan

- ✓ Bonnet macaque found in Indian peninsula
- ✓ Rhesus macaque found in north east, central India
- ✓ Assamese macaque found in foot hill of Himalayas
- ✓ Stump tailed macaque found in north east
- ✓ Lion tailed monkey found in western ghat
- ✓ Common langur common in India
- ✓ Golden langur Indo bhutan border
- ✓ Nilgiri langur- Western ghat
- ✓ Slow loris north east
- ✓ Slender loris south india





Bonnet macaque

Nilgiri langur





Golden langur

Lion tailed monkey

10. Artiodactyla

- ✓ Contains all even toed hoofed mammals, including the swine hippopotamuses and ruminants
- ✓ Includes Family Camelidae, Cervidae (true deer) Giraffidae (giraffes) & Bovidae (wild buffalo, bison wild goat & sheep)

Bovidae:

- ✓ Several group of bovines includes
- ✓ Gaur or Indian bison may weight of tonne, also rare & protected species.
- ✓ Bentang, Yak, Wild buffalo

- ❖ Yak (Bos grunniens) –
- ✓ It is a big herbivore seen in cold mountainous regions.
- ✓ Seen up to an elevation of 6100 meters and are gregarious and live in small herds.
- Wild Buffalo (Bubalus arnee)
- ✓ They are seen in the grassy jungles of Assam as well as in Dhanna-Karanya forests and look very much like buffaloes and wallows in mud and swamps.
- ✓ They mate with domestic buffaloes also and may attack without provocation.
- ✓ Excellent power of hearing and scent.
- ✓ Very much look like domestic Swamp Buffalo with large curved horns.
- **Banteng (Tsaine, Bos banteng) Distribution is mostly in Burma, Thailand, Malay Peninsula, Borneo and Java.**





Gaur or Indian bison

Bentang



Yak

Among wild Goat

- ✓ Tahr
- ✓ Markhor finest of all goat, long horn
- ✓ Ibex extending all over central Asia & up to Spain

Sheep

- ✓ Nayan also called Marcopolo's sheep found form ladakh to tibet
- ✓ Bharal or blue sheep found in western himalaya & extending up to Sikkim & Nepal
- ✓ Shapu or Uriyal Smallest of wild sheep





Marcopolo's sheep

Bharal or blue sheep



Shapu or Uriyal





Tahr

Markhor



Ibex

Antelopes:

- ✓ Antelopes and Gazelles are sub-divisions of Family Bovidae.
- ✓ Assumed that antelopes represent the original stock from which oxen and sheep evolved.
- ✓ e.g. Chiru, Chinkara, chawsingha, nilgai & blue bull.
- ✓ Black buck live in herds 50 to 60, leader is an adult male, hair coat is grayish or blackish brown above & white below.
- ✓ Chawsingha only member of this group with only two pairs of horns and exclusively seen in India.
- ✓ The front pair of horns is shorter. often the first pair is no more than a horny covered stud or a knob of bony
- ✓ Four Horned Antelope projection covered with skin.

- ✓ Another exclusive feature of Chowsingha is the presence of a pair of well-developed glands between the false hooves of the hind limbs.
- ✓ Present both in the male and the female.
- ✓ Mainly distributed in south Himalayas in woody and hilly tracts.

Pigs:

- ✓ Usually found almost all over country,
- ✓ Prefer to live in grasslands, scrub forest & dense forest
- ✓ e.g. Indian wild boar, Pigmy hog





Pigmy hog

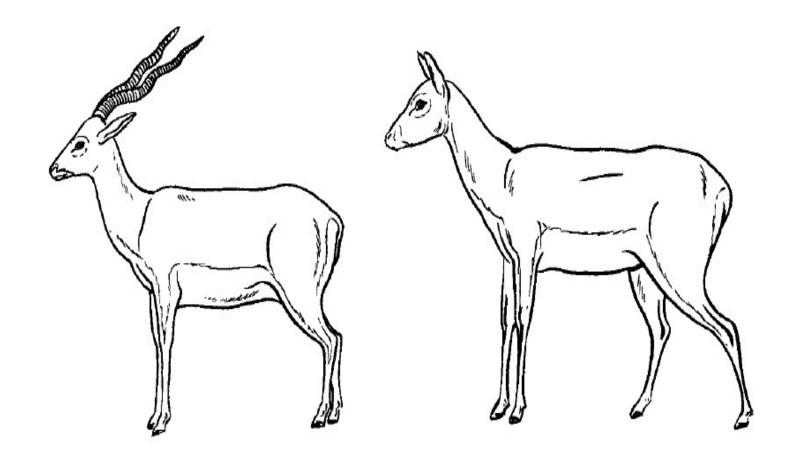
Chinkara





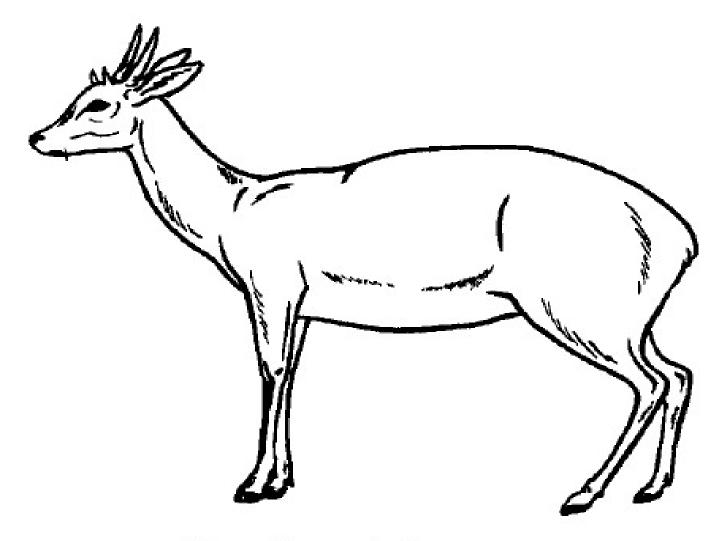


Black buck



Black Buck (Male)

Black Buck (Female)

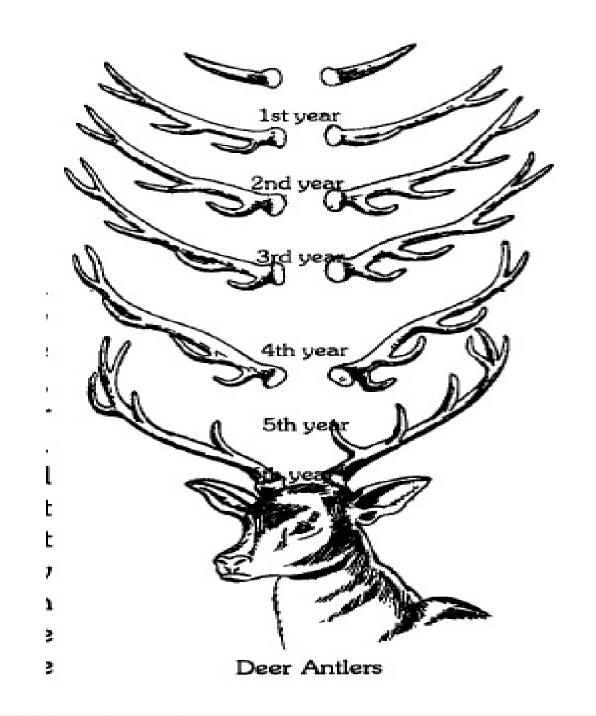


Four Horned Antelope

Deer:

- > Total 53 species of deer in world
- **❖** Cheetal (Spotted deer) − most beautiful cervids, body coat is reddish to yellowish brown, active during day & night, g.p. 230 to 238 days.
- **❖** Sambar − Largest Asiatic deer, coat is dark brown & pale, nocturnal in habit.
- * Hog deer short stout body, brown colour, keep their head low while running, solitary in existence.
- Barking deer small dear of Asia, make a sound similar to barking, deep chestnut colour
- **❖** Swamp deer (Barasingha) − found in kanha National park in M.P.
- Brown antlered deer also k,a. Dancing deer of manipur, found in Keibul Lamjo Sanctuary in Manipur, Most threatened deer species in world

- * Hangul (Kashmir stag) mainly confined to Dachigam Sanctuary in J. & K.
- * Musk deer much value for its musk pods, collected from males, large scale pouching has made threatened species, a special project called Musk deer breeding project launched by govt. of UP.







Cheetal

Sambar





Hog deer

Barking deer





Swamp deer (Barasingha)

Brown antlered deer





Hangul (Kashmir stag)

Musk deer

11. Perissodactyla

- ✓ Diverse order containing odd toed hoofed mammals
- ✓ Major wild equine species of India includes
- ✓ Asiatic wild ass Little rann of kutch
- ✓ Tibetan wild ass of trans Himalayan cold desert
- ✓ Great Indian one horned rhinoceros found in Kaziranga National Park, Assam





Asiatic wild ass

Tibetan wild ass



Indian one horned rhinoceros

12. Proboscida

- ✓ First elephant like animal evolved at Banks of Nile river in Egypt at 70 to 45 million years ago.
- ✓ Unique feature is presence of trunk
- ✓ Earlier 352 species of animals having proboscis, now only two remain Asian elephant & African elephant
- ✓ Asian elephant (*Elephas maximus*)— largest terrestrial mammals in asia but smaller than African Elephant (*Loxodonta africana*) with relatively smaller ears & size.

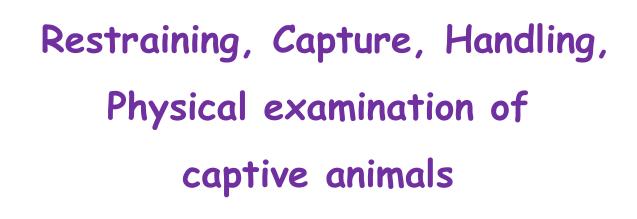


Asian Elephant

African Elephant



Thank You All...



Objectives

- ✓ Medication and vaccination, either oral or injection or topical application.
- Major and minor surgical operations and wound dressing.
- ✓ Trimming of nails, hooves and tails.
- ✓ Collection of materials for diagnostic investigations.
- ✓ Clinical examination.
- ✓ Transportation.

Methods

There are mainly two methods for restrain and immobilization of wild animals.

- ✓ Physical method
- √ Chemical method

Squeeze cage:

- ✓ Most useful tools for confinement and restrain of wild animals which are by their behavior very vicious, e.g. tiger, lion and bears.
- ✓ Different sizes and made of cast iron bars and may have small wheels.
- ✓ Once the animals enter the cage the mobility of the animal is restricted by squeezing the cage area through movement of side panels.





Squeeze cage: Used in Zoos for treatment of captive wild animals



✓ Squeeze cages are used to restrict the movement of wild animals for performing minor surgical operations, wound dressing or intravenous injections, etc. the part of the body which are to be operated can be taken outside the cages through the gaps of movable iron bars.

Wire netted string bags

✓ Useful for handling pups and small wild animals.





Snare and large nets with the arrangement of strings

- ✓ Good for trapping large and small size wild animals.
- ✓ By placing a net on animals, the movement can be restricted and manipulative operations can be performed at ease.
- The size of the mesh must not be large enough to permit the head inside and the danger of strangulation. Materials like nylon and cotton of the optimum durability and elasticity is recommended.

Roping and tying with bars of cages

✓ Bears can be restrained by roping them to bars of the cages while hippopotamus can be controlled by holding the jaws apart by means of ropes.

Mouth gags and leather hunters

✓ Used for wild dogs, wild cats, foxes and jackals.

Chemical restraint

- ✓ Most modern and best methods for handling of large and ferocious animals.
- ✓ Drugs which sedate and anaesthetized the wild animals can be injected from a distance by capture gun (dart gun).
- ✓ Vaccines, antibiotics, Tranquilizers, anesthetics can be administered by capture gun method.
- ✓ No need for first catching the animal for this purpose- The dart falls out soon after the medicine is delivered- Capture guns are also called as projected syringes.

Three types of guns are available

- ✓ Short ranger projector (pistol) powered by compressed carbon di Oxide. Range is 15 meters.
- ✓ Long range projector (rifle) is also powers by compressed Carbon di Oxide and the range is 35 meters.
- ✓ Extra long range- projector is powered by percussion caps. the maximum range is 80 meters.



- ✓ The syringe with embedded needle strikes the target, with pressure; the drug is discharged into the muscle.
- ✓ Chemical restraint is also termed as field anesthesia, meaning anesthesia of animal in the environment in which it lives.

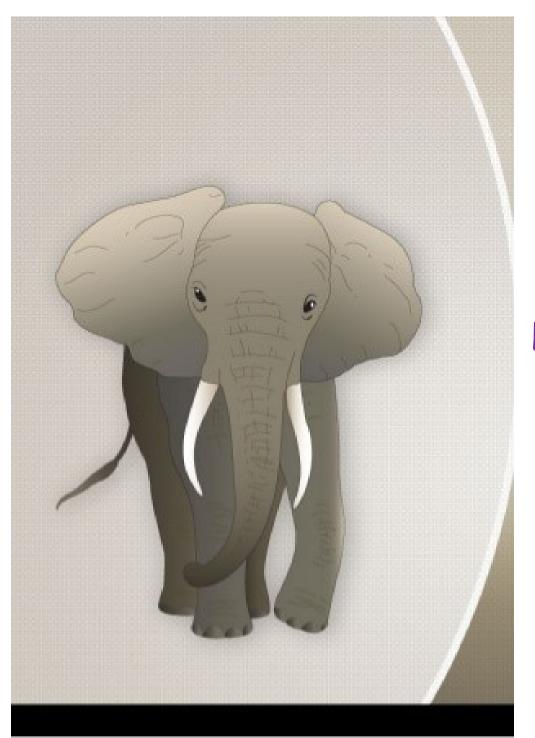
Handling and physical examination of wild animals

Handling of very young wild animals

- ✓ Infant wild animals are highly prone for the development of hypoglycemia.
- ✓ Further, once sedated among the adult animals, the infant animal may be crushed or even bitten by the other cage mates.
- ✓ Excitement caused during the capture operations might cause such type of unwanted reactions.
- ✓ Thermoregulatory derangements are to be taken care of immediately in any wild animal species and more particularly in case of infant wild animals.

Handling of very young wild animals

✓ If infections occur as found by severe dullness and sign of concerned disease, the animal has to be attended immediately. If not, immediate collapse occurs in case of wild animals in the neonatal state. THANK YOU ALL ...



HOUSING OF WILD ANIMALS

Broadly based upon the nature of the animal four types of classification are made.

- Flying, climbing or arboreal i.e., animals that often prefer to be above the ground. e.g., primates, birds, bears.
- Terrestrial (walking, hopping, crawling) e.g., Deer, antelope.
- Burrowing or digging e.g., Panqolins, burrowing snakes.
- Aquatic or needing water frequently or always e.g.
 Dolphins, crocodiles, Hippopotami, Rhino,
 Waterfowls

BASICS OF ANIMAL HOUSING

- Successful breeding potential
- Comfortable living conditions under captive
- Ensure a quality of life and longevity to enable the zoo population reared in captive status.
- Adequate space for the free type of movements that are generally carried out in the wild conditions to the possible extent.
- All Indian zoos should have enclosures confirming to "Recognition of Zoo Rules - 1992".

Enclosures should have

- Resting and retreating places (sleeping shelves, perches, platforms, trees, caves or sand banks)
- Hiding places (dens, burrows, holes, bushes, stone heaps)
- Place to give birth or brood (nesting boxes, nesting materials and hollow trees),
- Grooming (for skin and claws pawing logs, stones, pools, wallowing pools, mud bath, dust bath),
- Camouflage (trees and branches, various types of vegetation)
- Mental stimulation (swings, balls, poles)

Enclosures should have

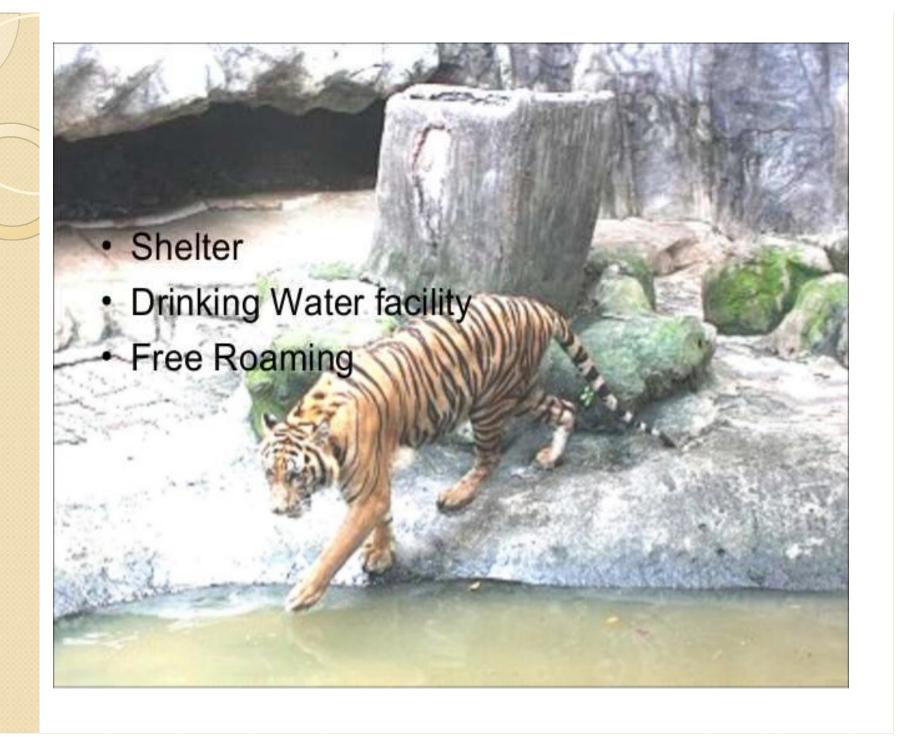
- Changed periodically to avoid boredom
- Stimulates their play with litter-mates.
- Free from health hazards like broken glass, nails, toxic fruits, sharp corners or any similar objects or poisons that could be hazardous to the animals.

COMPONENTS OF HOUSING ARRANGEMENTS IN WILD ANIMALS

- Appropriate shelter, perches, withdrawal regions, drinking water facilities, pools or water holes of suitable areas, and other facilities that may facilitate the concerned wild animal species.
- Help to display wide range of their natural behavioral patterns
- Adequate protection from the predators to a great extent.
- Construction of the moat gains more significance in the housing arrangements.



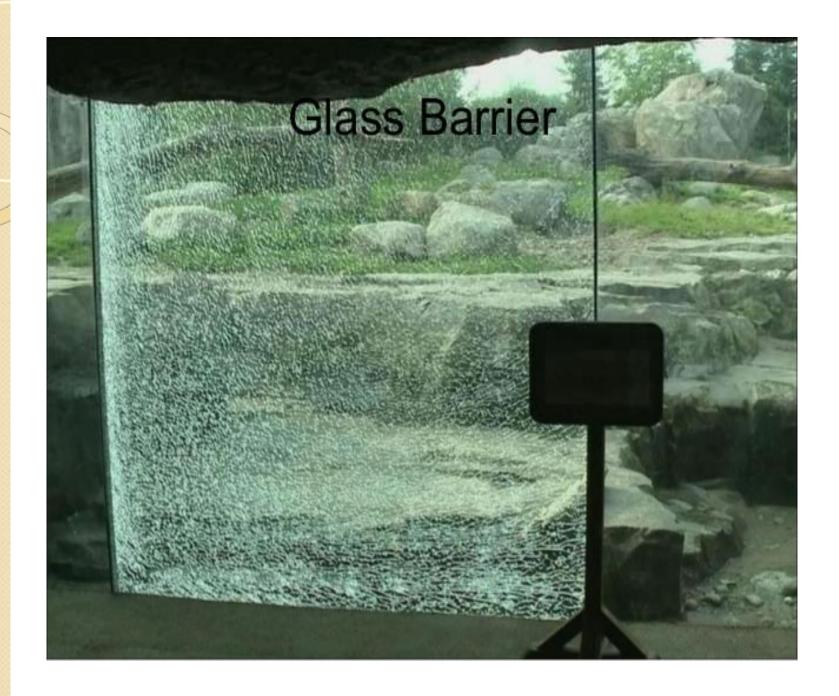




COMMON BARRIERS

Common six types of barriers that are generally used in case of captive wild animal places are given below:

- Glass panels
- Plastic panels
- Wire-mesh fencing or chain link fences
- Wet and dry moats of adequate dimension
- High tensile vertical wires
- Electrically charged wires
- Concrete barriers in selected sides











STAND-OFF BARRIERS

- Especially for the hazardous type of wild animal species like tiger, panther, lion, jaguar etc.
- If there is a direct contact between the wild animal species and the visitor, then there are chances for the visitors to get injured by the highly capable animals like lions, tiger etc.
- Hence, there is an immediate requirement to construct the stand-off barrier like the construction of Spaced-out railing beyond the barriers which help top prevent any accidental contact with the concerned wild animal species.

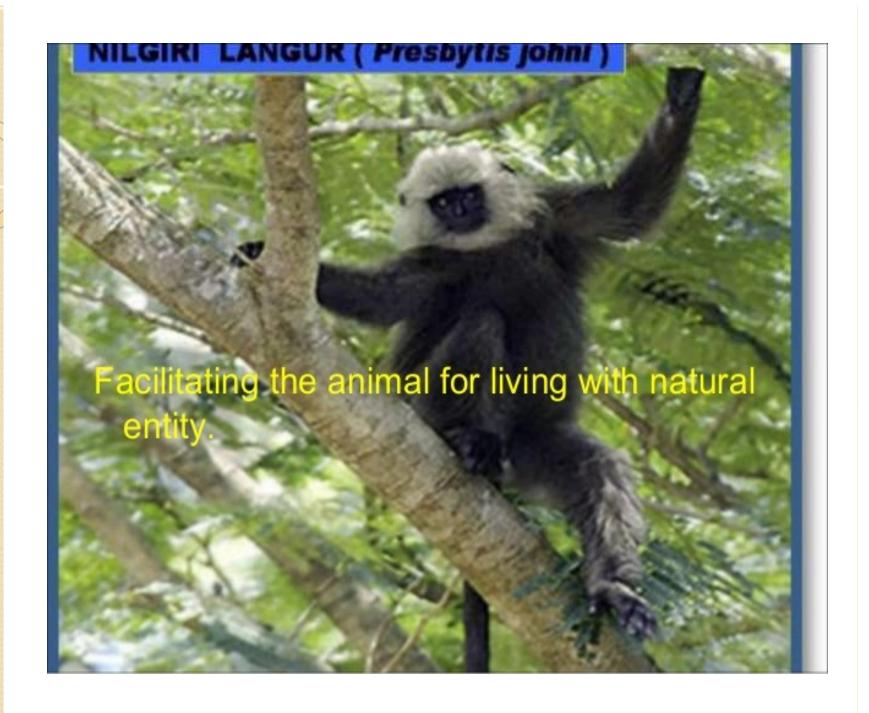






NATURAL APPEARANCE

- Housing arrangements need to merge with the natural surroundings.
- For many wild animal species housing arrangements should include naturally simulating infrastructures and for e.g., trees may be placed / grown inside the <u>arboreal species</u> like nilgiri langur.
- The visible structural elements of the barriers that are in direct line of the vision of visitors and exhibit species should be painted suitably, so as to render those structural elements to appear like those of local soil.



INSIDE-OVERHANGS AS HOUSING FACILITY

Following wild animal species need the inside-

overhangs in general

- Cheetah
- Zebra
- Wild ass
- Musk deer
- Brow antlered deer



- Four horned antelope
- Chinkara
- Nilgiri tahr



FLOOR OF MAMMALIAN ENCLOSURES

- In case of elephants floor should not be made only by concrete.
- Natural substrate has to be provided to avoid the foot rot. Similarly, for cervids and antelopes, natural floor is a must.
- Avoid the presence of any pointed materials
- Drainage facilities need to be provided
- Flooring arrangement needs to be made in order to facilitate an easy cleaning of the premises.
 Crevices need to be taken care of during the routine management.





FLOOR OF AVIARIES

- Care has to be taken to protect the aviary species from the predators that use the floor or sides, often.
- Rodent control is an important measure for the wild birds that are kept in the confined state.
- Floors of aviaries should have cement concrete floors in order to prevent the entry of rodents and have to be topped by the layer of about 15 cms earth.

FLOOR OF REPTILIAN HOUSES

- The <u>reptilian houses</u> should have land as well as the water-designs that should allow the sufficient space for both bathing and basking.
- The substrate for the reptile cages should be of pea-sized gravel or sand material depending upon the species of the reptiles.



DOORS

The doors of any wild animal species should be constructed considering the following factors in mind:

- Safety
- Durability
- Easy handling nature
- Vertical doors are to be avoided and horizontally, sliding doors may be used with proper lockpositions



Door of zoo animal houses

Safety
Durability
Easy handling

BREEDING DESIGN

The housing arrangement should have facilities to facilitate the breeding related activities whenever required for the concerned wild animal species for e.g. like

- Required to lower the water in hippo pools to 30 –
 40cm when birth of the hippo calf is expected.
- Escape route is a must for the male felids during mating with female animal.

HOUSING FOR DIFFERENT SEXES

- Many times, if both sexes are kept in same place, fight may occur - animal may often gets injured and this will create unwanted problems in the health related management.
- Separate housing arrangements have to be constructed for the proper housing of different sexes. Species like tigers, lions etc
- Even giraffes may fight with each other many times when the same housing facility is used by both sexes of this exotic-wild animal species.



ANATOMY AND HOUSING ARRANGEMENTS

- The entry door of the enclosure has to be constructed in a careful manner in order to avoid the injuries to the wild animal.
- The opening has to be an adequate one, so that the concerned wild animal species can make entry freely into the enclosure.
- The entry door of the wild animal species like Giraffe
 has to be built so high enough to accommodate the
 long neck of this animal.
- Elephant should enter into the enclosure freely without any struggles

Height of Entry gate



NATURE OF THE SPECIES AND HOUSING

- The nature of the concerned wild animal species has to be given more significance whenever a proper housing arrangement is made.
- Chimpanzees generally are reluctant to approach the water resources except for the drinking purposes. Hence, wet moats are generally preferred ones whenever housing arrangements are made for them.

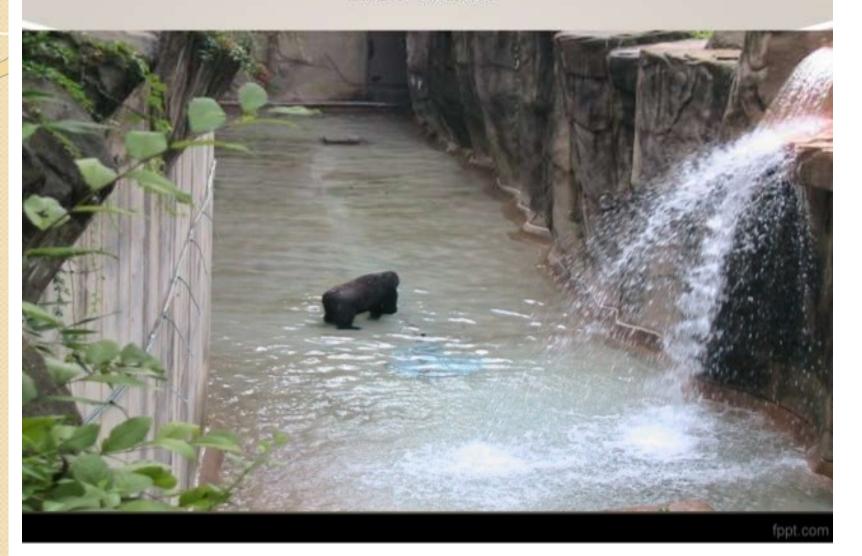
NATURE OF THE SPECIES AND HOUSING

- Giraffe do not swim and hence will not have inclination to cross the water moat.
- Giraffe are generally reluctant to step over the barriers and also have been very rarely observed to step over the shallow ditch.
- Similarly, Giraffe can extend the neck to a great extent during the attempting of trying to receive food material if any given by visitor.
- Hence, during the construction of housing facilities for species like this, all considerations have to be given to such nature of this species.

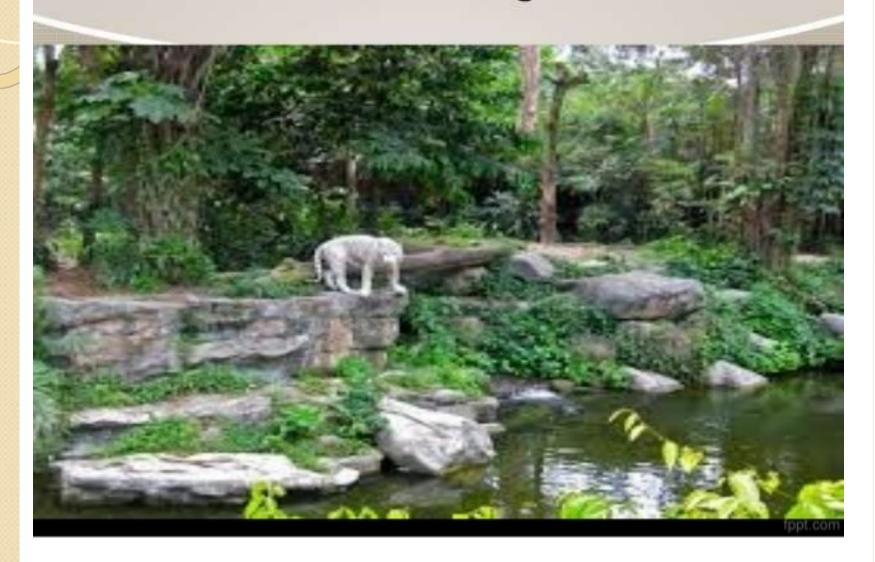
NATURE OF THE SPECIES AND HOUSING

 Wet moats with resting platforms appear to be the must in case of housing arrangements for felids like tigers.

Wet Moat



Moat for Tigers



TIME-BUDGET ACTIVITY AND HOUSING

- Consideration needs to be given to the time budget activity of the wild animal species kept as exhibit in the zoo.
- Nocturnal wild animal species like wolf may prefer to retire during the day time - Dens may be provided for these species in their housing arrangements.
- Similarly, separate arrangements have to be made while building housing facilities for the nocturnal wild animal species like owl, palm-civet etc.

Time budget activity



Retiring during day time

Nocturnal cave



Indian Civet



Owl

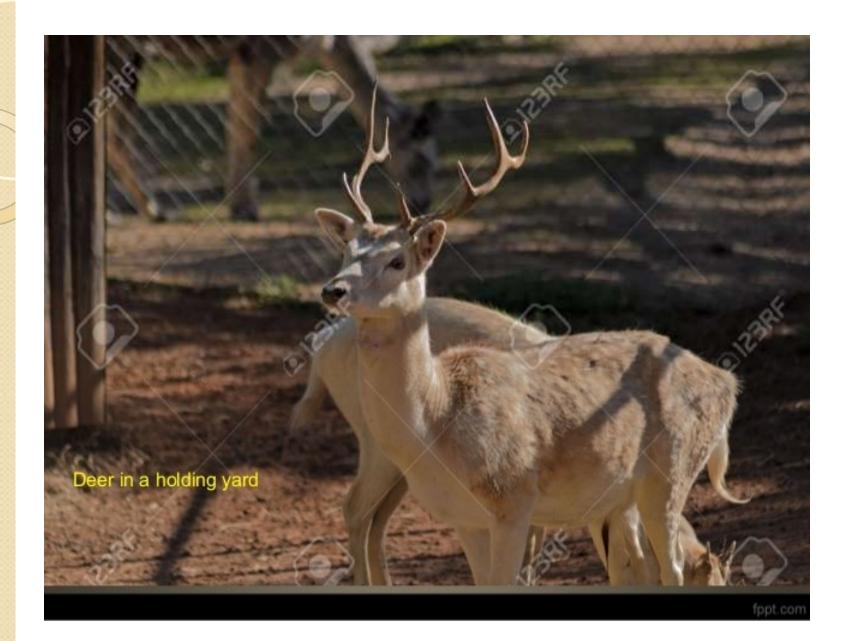


VENTILATION AND ENVIRONMENTAL FACTORS

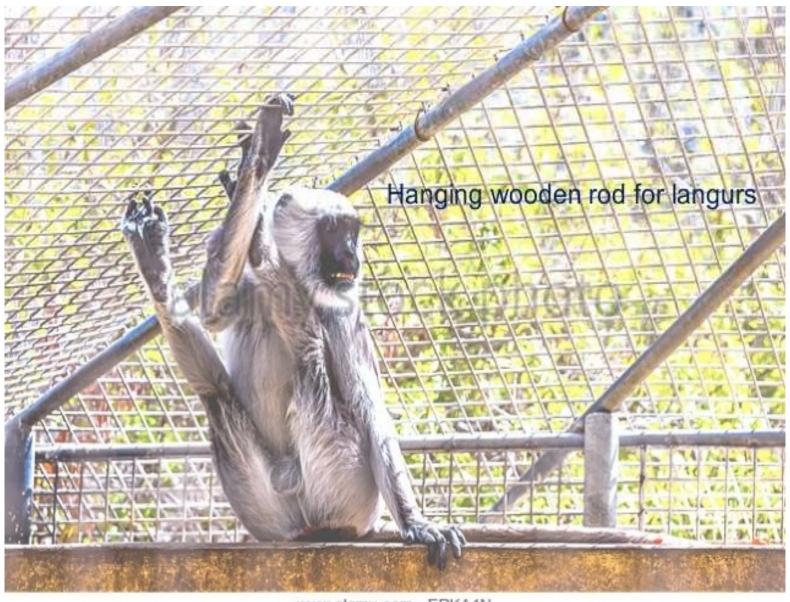
- To avoid the occurrence of respiratory infections like pneumonia to the new born wild animal species as in case with bear cubs etc.
- Arrangements have to be made for the provision of rooms or places, so that the concerned wild animal species that is kept in confined status may get opportunity to escape from the extremes of climate etc.
 This is one of the important feature especially for the new born wild animals or young ones or sick animals.
- Arrangements for heating or cooling in the indoor enclosure - extreme environmental temperaturevariations.

HOLDING YARDS AND BIOLOGICAL NEEDS

- For wild animal species like spotted deer, Sambar deer etc., small holding yards are often used to keep the released cervids (from quarantine places) for some days. This facility in captive wild animal places often helps to keep the wild animals acclimatized with the environment.
- Snakes need mud-pots for laying of eggs.
 Similarly, arboreal non-human species like
 Common langurs need hanging types of wooden rods for climbing activities.



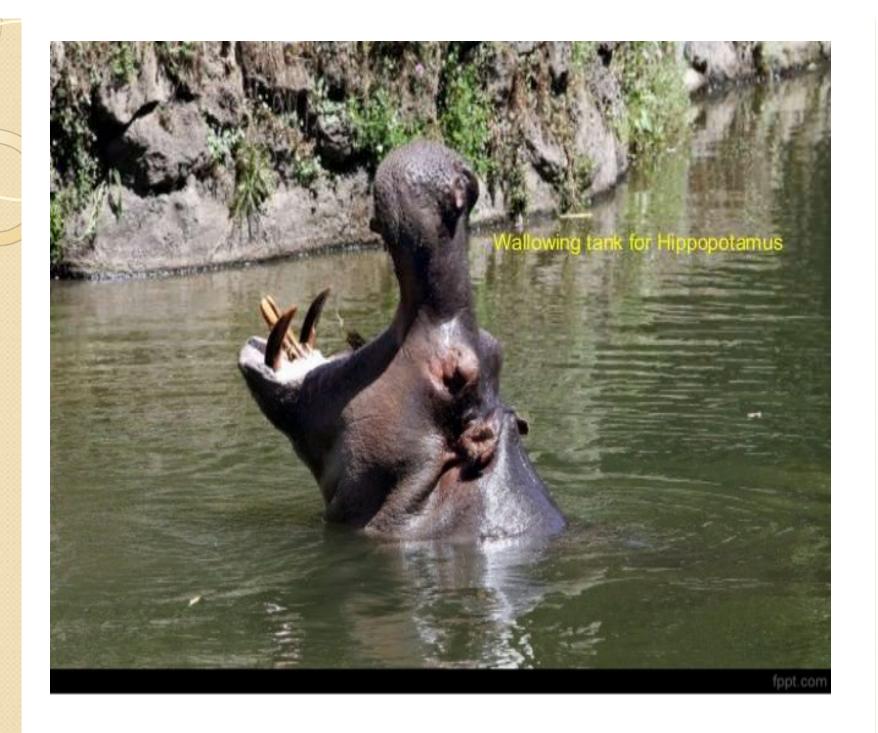




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HOLDING YARDS AND BIOLOGICAL NEEDS

- Wallowing tank or water source to move freely is to be provided for Elephant, Rhino, Sambar deer etc.
- Among the felids, emphasis may be given to provide water filled tank for submerging or sitting in summer periods for <u>tigers</u>, in particular.

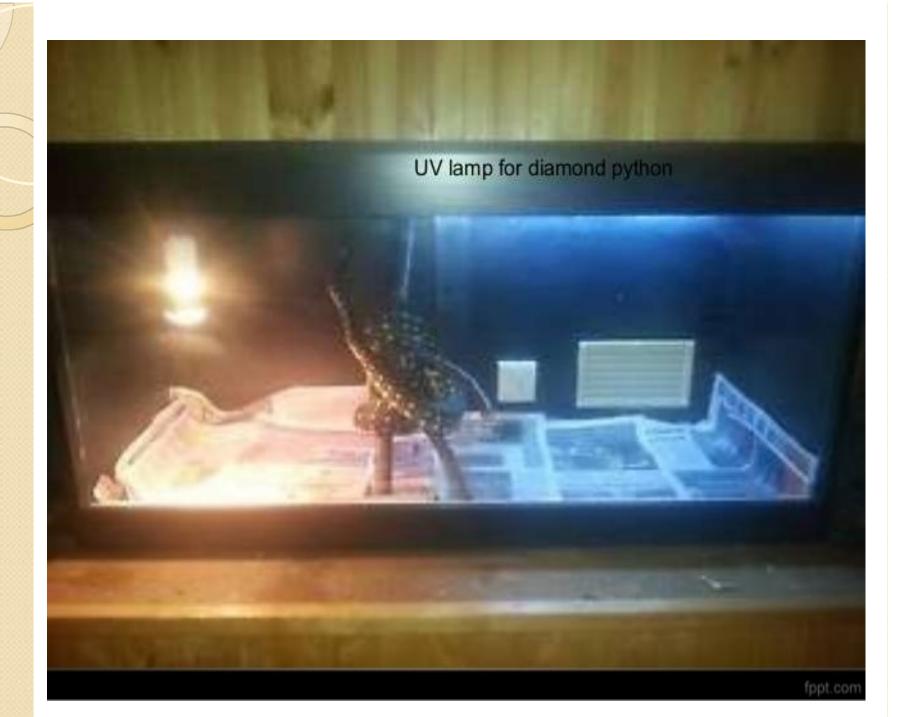


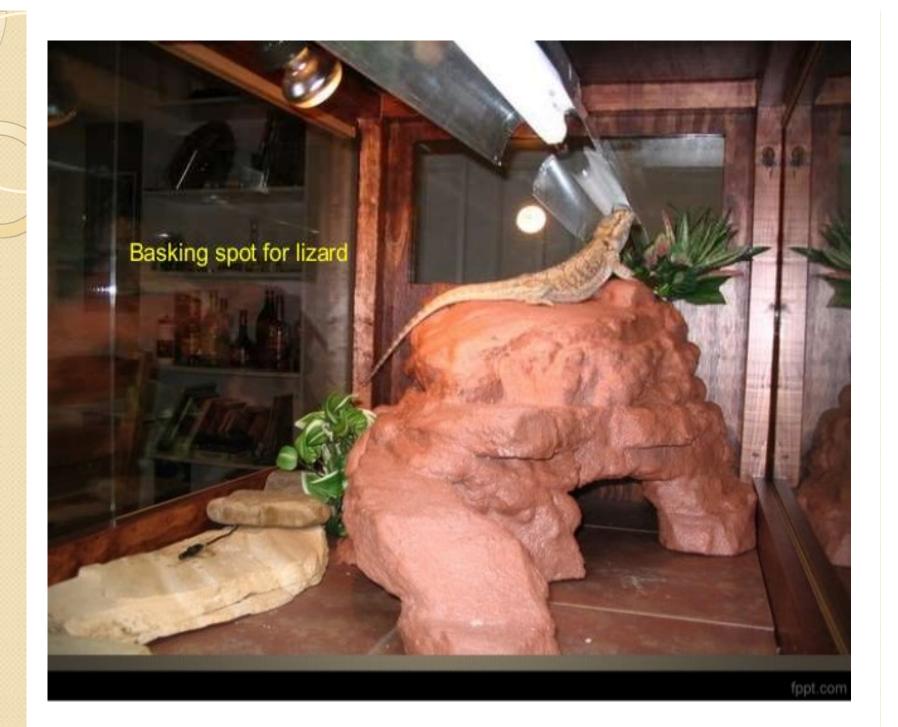
LIGHTING FACILITIES AND HOUSING

- Proper lighting facilities To inspect the wild animal even in the night hours also.
- However, the nocturnal and diurnal activity pattern of the wild animal has to be taken care of while lighting facilities are used in the enclosures.
- Reptiles like diamond pythons, lizards etc. may require Ultra Violet type that has non-visible wavelength and the UV-bulb may be fixed in such

a manner that the concerned reptile may get maximum light.







FEEDING PLACE AND HOUSING

The place for feeding should be constructed in such a manner that the cleaning of the premises becomes an easy one and the crevices in the feeding trough needs to be attended properly during the maintenance of the feeding trough or place. - helps to avoid the deposition of feed particles in the structures and thereby the chances for contamination of food particles get minimized.

FEEDING PLACE AND HOUSING

 Multiple feeding places are the better ones especially for the animals that are exhibited in herds like spotted deer, Manipuri deer, black bucks etc.

WATERING AND FOOT BATH ARRANGEMENTS

- The watering facility should be thought of whenever a housing facility is constructed for the concerned wild animal species.
- The capacity of wild animal species with regard to the watering habits needs to be paid more emphasis.
- For example, an elephant may require about two hundred and twenty liters of water in a day.

WATERING AND FOOT BATH ARRANGEMENTS

- Watering trough should be of adequate size and should have an easy access for the wild animal species to have water whenever it desires.
- Need to be constructed outside the enclosure and by placing appropriate agents, it becomes possible to prevent or minimize the entry of microbes through the visiting personnel.
- Place of foot bath should be inspected frequently to avoid the slippery nature of the floor.

WATERING FACILITY





Drinking water facility for elephants



Foot bath facility

##avoid the slipperiness of floor

THANK YOU ALL ...

Feeding habits, feeds and feeding schedules of captive animals

- ✓ Feeding in wild animals is different under captive conditions and in free ranging conditions.
- ✓ Feeding is a controlled activity in case of captive wild animal species unlike in case of free ranging wild animal species in which cases, the animal by itself attempt to have some control measures.
- ✓ Differing feed habits captive wild animal places that are rich in multiple species of wild animals.
- ✓ Preliminary knowledge of the feeding related activities in the concerned wild animal species and a basic knowledge of nutrition, proper diets etc. is an essential one.
- ✓ Scientific mode of feeding-strategies forms the basis for the scientific management of wild animal places.

Significance of balanced nutrition

- ✓ Longer life span of the animal
- ✓ Maximal reproduction
- ✓ Maximal infant survival rate
- ✓ Appreciable health status
- ✓ Acquiring of good immune mechanisms

Feeding strategies and schedule in wild animals

- ✓ Otters, badgers, pelicans, penguins, gharials, dolphins, ferrets, pole cats, mink etc. are often fed with fishes.
- ✓ Hence, more care needs to be taken while feeding the fish to the wild animals.
- ✓ Rotten fish or fish with more pungent smell are to be avoided. Gill regions in the fishes need to be examined for the freshness.
- ✓ Avoid the feeding of fishes like carps and herring that contain the enzyme termed thiamenase since this may destroy the thiamine in the diet.

Feeding strategies and schedule in wild animals

- ✓ Cooked fish or fishes like butter fish and mackerel may be used. Usage of oily fish like herring in fish meal may lead to the oxidation of vitamin A and E in the diet.
- ✓ Wide trays may be used for feeding of species like star tortoises.

- The feeding habit varies from species to species.
- Chewing bones is a preferred activity among lions, tigers and jaguars and the activity is less in panthers.
- These carnivores prefer larger pieces of meat to alleviate hunger more readily than the smaller meat pieces. Lions and tigers carry the beef pieces to one side of the cage before it sits for feeding.
- In lion, tiger and jaguar the posture of consumption was
 of extending the fore legs and holding the meat while the
 hind legs are tucked up within the body, where as in
 panthers all the four legs tucked up within the body.

- Wild dogs eat while they were in standing position in a hurried gulping manner.
- Among the large felines like tiger, lion, panther and jaguar the time taken to consume the meat was from 16.5 minutes to 39 minutes in a very slow manner.
- Tigers soon after feeding they lick the cage wall few times and then drink water, where as in lions they drink water soon after feeding.
- After the weekly starvation in lions and tigers a characteristic restlessness was evinced by the sound and arrival of the food delivery vehicle.

- During the act of drinking the large cats curl tongue backward and then flick it forward, rolling it up slightly into a spoon shape, as they do so and they swallow after every 4 or 5 laps.
- Tigers, Jaguars and Panthers show a preference for chicken meat when offered than beef.
- Almost all species of the carnivores like panther, lion, wild dog and tiger eat quickly in winter than in summer.
- In panther, lion and tiger, smelling and licking of the meat were noticed. Tigers and lions show a greater degree of smelling the licking than the other species.

- Elephants use trunk as prehensile organ and may even pick up grass by using strikes with legs on ground and later, the grass materials may be striked on its own legs to wither away the dirt or sand and then by using the trunk, they may place the feed materials into the mouth. The trunk will not be protruded during eating activities of the elephant.
- Bears have the habit of climbing the trees or rocks in order to remove the bee hives and by using forelimbs, the hives are destroyed and use to suck honey in addition to lapping using tongue.
- Crocodile have the habit of gulping the feed materials.

CARNIVORES

Lion and Tiger

- Beef (with bone) 10 kg
- Liver 500 gms
- Chicken 1 kg (weekly once)

Jungle cat

- Chopped beef 250 gms
- Bread slice 2 no
- Milk 100 ml

Jackal

- Beef without bone 500 gms
- Liver 100 gms
- Chicken 250 gms weekly once.

Hyena

- Beef 3 kg/day
- Liver 100 gms
- Chicken 500 gms weekly once.

Panther

- Beef (with bone) 3 kg
- Liver 250 gms
- Chicken 1 kg (weekly once)

Herbivores

Indian Elephant

- Ragi 7 kg
- Horse gram 2 kg
- Salt 200 gms
- Jaggery 250 gms
- Grass 200 kgs
- Sugarcane 4 nos
- Green tree leaves –
- Bamboo / stylo 250 kg
- Coconut 500 gms (1 no)

Omnivores

Sloth bear

- Ragi (cooked) 250 gms
- Rice gruel + black
 gram 150 + 50gms
- Orange / Mango 2 nos
- Guava 4 nos
- Tapioca 100 gms
- Jaggery 200 gms
- Groundnut (WOS) 100 gms

Omnivores

Porcupine

- Rice 100 gms
- Carrot 100 gms
- Cabbage 100 gms
- Tapioca or sweet potato100 gms
- Soya bean 20 gms
- Groundnut (WOS) 150 gms

Bear

- Honey bi-weekly
- Milk ½ litre
- Radish 100 gms
- Bread slices 2 nos
- Carrot 200 gms

Otter

- Fish 1.5 kg
- Crab (weekly twice) 300gm
- Sardine 1.5 kg

Herbivores

Zebra (adult)

- Wheat bran 2 kgs
- White Bengal gram 100 gms
- Grass and leaves 30 kgs
- Mineral mixture 10 days in a month at regular intervals.
- Lucerne 5 kgs

Camel

- Wheat bran 2 kg
- White Bengal gram 500 gm
- Grass 30 kg
- Leaves (neem, bamboo,
- Subabul, bauhina) 20 kg
- Salt 50 gm
- Cabbage 2 kg
- Banana 6 no
- Leaves of acacia 5 kg

Herbivores

Indian bison (Gaur)

- Wheat bran 3 kg
- Bengal gram 0.5 kg
- Green leaves/ grass L.S

Barking deer/ Spotted deer/Sambar deer

- Wheat bran 1 kg
- White Bengal gram 25 gm
- Grass 7 kg
- Green leaves 3 kg
- Salt 10 gm
- Stylo/Lucerne 2 kg

Reptiles

Marsh crocodile (adult)

- Fish (twice a week) 250 gm
- Bone (vertebral column) 100 gm
- Beef 250 gm

Gharial (adult)

- Fish (twice a week) 1 kg
- Bone (vertebral) 100 gm

Python

- Chicken 1 kg (twice a month)
- Rat 8 no (twice a month) each 150 gm size.

Reptiles

Viper

- Chicken 3 no
- Rat 4 no (weekly once) 100-150 gm size.

Cobra

- Chicken 3 no
- Rat 4 no (weekly once) 100-150 gm size.

Iguana

- Carrot 50 gm (daily)
- Cabbage 50 gm (daily)
- Tomato 50 gm (daily)
- Greens 100 gm (daily)

Reptiles

Star tortoise

- Carrot 30 gm (daily)
- Cabbage 30 gm (daily)
- Tomato 30 gm (daily)
- Greens (L.S) 500 gm (daily)

Classification of zoos

Purposes of deciding standards and norms for recognition of zoos and monitoring and evaluating their performance,

- ✓ On the basis of area
- ✓ Number of animals
- ✓ Species, endangered species
- ✓ Number of animals of endangered species exhibited

		Category of the Zoo			
		Large	Medium	Small	Mini
Number animals exhibited	of	More than 750	500 –750	200 -499	Less than 200
Number species exhibited	of	More than 75	50 – 75	20 – 49	Less than 20
Number endangere species exhibited	of ed	More than 15	10 – 15	5 – 9	-
		More than 150	100 –149	50 – 99	-

Management of sanctuaries, national parks

What is a National Park?

- ✓ A National Park is a natural space that is dedicated for the purposes of conservation, recreation, and protection.
- ✓ Different countries have their own national parks and the designation of national parks across the globe depends on each individual country's system and judgment.
- ✓ But most national parks have similar aims to conserve wild nature in order to protect it for the future as well as allow people the chance to enjoy it.

- ✓ National parks are often a symbol of national pride.
- Most national parks are open to the public and provide opportunities for recreation, camping, and walking.
- ✓ Most national parks have an outstanding level of natural beauty, whether the beauty comes from mountains, lakes, rivers or plains.

- ✓ First national park was established in the United States in 1872 – Yellowstone National Park.
- ✓ Mackinac Island in the US was established in 1875
- ✓ Third national park created in the world was the Royal National Park in Australia.
- ✓ The largest national park by area is the Northeast Greenland National Park, which was developed in 1974.

What is a Wildlife Sanctuary?

- ✓ Animal sanctuaries exist for many specific reasons, but the overriding reason is to help protect animals and safeguard their lives.
- ✓ Animal sanctuaries give new homes to abandoned animals and animals rescued from dangerous conditions, help to protect animals from illegal activities, and serve as places where endangered animals breed and are therefore protected.

What is a Wildlife Sanctuary?

- Animals in animal sanctuaries cannot be responsibly returned to their natural habitats as they are not fit enough for the wild, or their habitat has been destroyed.
- A sanctuary is a haven, a place where animals can be protected.

What are the Benefits of National Parks and Wildlife Sanctuaries?

- ✓ Protect Wildlife
- ✓ Protect Landscapes
- ✓ Preserve History
- ✓ Preserve Cultures and Tribes
- ✓ Giving People the Chance for Healthy Activity

THANK YOU ALL ...

Acts and Rules related to captive animals

Wildlife Protection Act, 1972

- ✓ This was amended in the year 1991, 2003, 2006, 2013.
- ✓ According to this act, "Wildlife" is defined as 'any animal, bee, butterflies, crustacean, fish and moths and aquatic or land vegetation'. Thus it is to be understood that Wildlife is the term that embraces all life forms that are wild or care themselves.

Section – 18 - Declaration of Sanctuary

✓ The State Government may by notification declare its
intention to constitute any area or area comprised with
any reserve forest or territorial waters as Sanctuary if it
considers that 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.

Section – 27 - Restriction of entry in Sanctuary

- √ No person other than
 - A public servant on duty
 - A person who has been permitted by the Chief Warden or the authorized officer to reside within limits of the sanctuary.
 - A person who has any right over immovable property within limits of the sanctuary.
 - A person passing through the sanctuary along a public highway
 - The dependents of the person classified in class (1),
 (2), (3)
- ✓ Shall enter and reside in the sanctuary, except under and in accordance with the conditions of a permit granted under section 28.

Section – 28 - Grant of permit

- ✓ The Chief Wildlife Warden may on application grant to any person a permit to enter or reside in a sanctuary for all (or) any of the following purpose:
 - Investigation or study of Wildlife and purposes of ancillary or incidental threats.
 - Photography
 - Scientific research
 - Tourism
 - Transaction of any lawful business with any person residing in the sanctuary.
- ✓ A permit to enter or reside in a sanctuary shall be issued subject to such conditions and on payment of such fee as may be prescribed.

Section – 33 A - Immunization of Livestock

- ✓ The Chief Wildlife Warden shall take such measures in such manner as may be prescribed, for immunization against communicable diseases of livestock kept in or within 5 kms of the sanctuary.
- ✓ No person shall take or cause to be taken or grazed any livestock in a sanctuary without getting it immunized.

Schedules

✓ Schedule I to VI are dealt by Wildlife Protection Act 1972 with amendments during 1986 and 1991.

Schedule I

Part I – Mammals

✓ Indian chinkara, Indian lion, Indian wild ass, Indian wolf, leopard, leopard cat, Lion-tailed macaque, Loris, Gaur or Indian Bison, Cheetah, Indian gazelle, Dugong, Nilgiri Tahr, Niligiri langur, Musk deer, Sloth bear, Tiger, Wild Buffalo, Mouse deer, Hog badger, Hispid Hare, Chinese pangoling, Crab-eating macaque, Desert fox, Fishing cat, Four-horned antelope, Indian one-horned Rhinoceros, Rusty spotted cat, Serow, Swamp deer etc.

Part II – Amphibians and Reptiles

✓ Pythons, Water lizard, Gharial, Estuarine (or) Salt water crocodile, Golden Gecko, Green sea turtle, Leathery turtle, Logger head turtle, Hawksbill turtle, Indian eggeating snake.

Part II A – Fishes

✓ Whale shark, Shark, Ray, Sea horse, Giant grouper.

Part III - Birds

✓ Hornbills, Mountain quail, Peafowl, Andaman teal, Nicobar megapods, Nicobar pigeon, Bengal florican, Black-necked crane etc.

Part IV – Insects

✓ Butterflies and Moths.

Part IV A – Coelentrates

✓ Fire coral, Sea fan, Roof building coral.

Part IV B - Mollusca

Part IV C – Echinodermata

✓ Sea cucumber (all Holothurians)

Schedule II

- ✓ Part I Bonnet macaque, Common langur, Wild dog, Chameleon, Spiny tailed lizard or Sanda.
- ✓ Part II Beetles.

Schedule III

Chital, Barking deer or Muntjac, Gorals, Hog deer, wild pig, Nilgai, Sponges.

Schedule IV

Indian Hedgehogs, Indian porcupine, Mongooses, Polecats.

Schedule V

✓ Common crow, Fruit bats, Mice, Rats, Five striped palm squirrel, Black napped hare, Common Indian hare, Desert hare, Himalayan mouse hare.

Schedule VI

- ✓ Birds like Coots, Cranes, Cormorants, Flamingos, Ibises.
- ✓ Ladies slipper orchids, Red Vanda, Blue Vanda.

Indian Biological diversity Act, 2002

✓ This is act to provide for constitution of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected there with or incidental threats.

Other acts

- √ The Forest (conservation) Act, 1982
- √ The Indian Forest Act, 1927
- ✓ The Indian Fisheries Act, 1897
- ✓ Elephant preservation Act, 1879
- ✓ Bengal Rhinoceros Act, 1932
- ✓ Bombay Wild animal and wild birds Protection Act, 1951
- ✓ The Cruelty against animals Act, 1960

National Institutions and Organizations

Bombay Natural History Society (BNHS)

- ✓ It is the largest Non-government organization engaged in nature conservation research.
- ✓ BNHS-India, a pan-India wildlife research organization, has been promoting the cause of nature conservation for the past 133 years, since 1883
- ✓ Role and functions were mainly related to the fact that conservation must be based on scientific view.
- ✓ Dr. Salim Ali was the first Indian Honorary Secretary in this organization.

Wildlife Institute of India (WII)

✓ Established in Dehradun in 1982 with an objective of becoming a significant centre for wildlife training, research, publication and extension in India.

Functions and roles

- Training of personnel for protected area management and wildlife research.
- Training of education and extension specialists for protected area management and wildlife research.

Wildlife Institute of India (WII)

- Offering of orientation courses for those who are involved in land use management.
- Provision of advisory and consultant service to central and state governmental agencies, universities, colleges, institutions and other official and non-official agencies.
- Creation of databases by employing modern computerized analytical techniques.
- To conduct and co-ordinate applied wildlife research.

Indian Board for Wildlife (IBWL)

- ✓ Prevents cruelty against birds and beasts caught alive.
- ✓ Promotes public involvement in wildlife and its preservation in harmony with natural and human environment.
- ✓ 1st phase of IBWL was confined to protection of wildlife from poachers and dishonest hunters.
- ✓ 2nd phase was associated with development and creation of National Parks and Sanctuaries where threatened species are protected.
- ✓ 3rd phase was associated to the detailed study and improvement in the existing food and water reserves, offering of effective protection to threatened species and fast development of wildlife sanctuaries.

Botanical Survey of India (BSI)

✓ Carries out surveys on faunal resources of India.

Zoological Survey of India (ZSI)

- ✓ Carries out surveys on the faunal resources of India.
- ✓ ZSI has published the Red Data Book on Indian animals.

 Indian Institute of Sciences (IIS)
- ✓ Located at Bangalore and is involved in studies on ecology and wildlife of Western Ghats.

Wildlife Protection Society of India (WPSI)

- ✓ It is a NGO founded in 1958 at Dehradun. Promotes interest and knowledge among people in the field of preservation and conservation of all kinds of fauna and flora and management
- ✓ Supports in enforcement of wildlife protection act.
- ✓ Promotes wildlife tourism.
- ✓ Co-operates with state Government of India as well as other societies and institutions for the interest of wildlife protection.
- ✓ Protects, propagates and conserves the wildlife.

Central Zoo Authority (CZA)

✓ This is the highly empowered statutory body established in 1992.

Main functions are

- To specify the minimum standards for housing and veterinary care of the zoo animals.
- To provide technical and other assistance to zoos for their proper management.
- To identify endangered species of wild animals for the purpose of captive breeding.
- To recognize or derecognize zoos

Main functions

- To evaluate the functioning of a zoo.
- To co-ordinate research in captive breeding and educational programmes
- To ensure maintenance of stud book of endangered species of wild animals bred in captivity.
- To restrict the power of a zoo regarding acquisition or transfer of any wild animal specified in schedule I and II.

National Board for Wildlife (NBWL)

- ✓ Started in 1952.
- ✓ Highest advisory body of the Government of India regarding wildlife.
- ✓ It is active for legislation of wildlife protection act and guides central and state government on matters pertaining to wildlife through legislative and practical measures.
- ✓ Helps to solve the policy matters.

Wildlife Trust of India (WTI)

- ✓ It is a non-profit conservation organization located in Delhi.
- ✓ It works on conservation related programmes in India through a team of professionals comprising of biologists, veterinarians, communication specialists, lawyers, etc.
- ✓ This organization has special programmes pertaining to sloth bear, Elephant, tiger, rhinoceros, etc.

National Institutions and Organizations

- ✓ Department of Wildlife Science,
- ✓ Tamilnadu Veterinary and Animal Sciences University,
 Chennai
- ✓ Centre for Wildlife Forensic and Health, M.P. Veterinary University, Jabalpur
- ✓ Indian Veterinary Research Institute, Bareilly, UP
- ✓ Karnataka Veterinary, Animal and Fisheries Sciences University, Karnataka
- ✓ These institutions are currently involving in teaching, research and extension activities pertaining to wildlife science.

International Institutions and Organizations

International Union for Conservation of Nature and Natural Resources (IUCN)

- ✓ Now it is called as World Conservation Union.
- ✓ World's largest and most important conservation network.
- **✓** Multi-lingual, multi-cultural organization.

Role and Functions

- ✓ It links both research and results to local, national, regional and global policy by convening dialogues between Governments, civil society and private sector.
- ✓ Supports and develops cutting-edge conservation science and implements this research in field projects around the world.
- ✓ Facilitates paths for peace between countries in areas of conflict and works with the corporate sector on energy and bio-diversity.
- ✓ Species Survival Commission (SSC) is one of the Commissions of IUCN which has aim of conservation of biodiversity.

Convention on International Trade in Endangered Species (CITES)

- ✓ This organization helps to prevent the over-exploitation of wild fauna and flora.
- ✓ Government of India signed this convention in July 1974 and became a party to it from 18th Oct, 1976.

Role and Functions

- ✓ People and states are linked for best protection of their own wild fauna and flora.
- ✓ Stresses on need of International collaboration.
- ✓ Stresses on need of undergoing the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational and economic point of view.
- ✓ Emphasizes that the wild fauna and flora in their many beautiful varied forms are on irreplaceable part of the natural systems of the earth.

United Nations Development Programme (UNDP) and Food and Agriculture Organization (FAO):

✓ Organizations are associated with all features of conservation, in general.

Trade Records Analysis of Flora and Fauna in Commerce (TRAFFIC)

- ✓ It is a wildlife trade watch group of IUCN and WWF for nature.
- ✓ Started in 1975 with the aim of monitoring wildlife trade worldwide.
- ✓ It collects and analyses the data on wildlife trade.
- ✓ TRAFFIC India was established on 1/01/1992 as a division of WWF India and a part of global TRAFFIC network.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

✓ It launched man and bio-diversity programme

World Wide Fund for Nature (WWF)

- ✓ It was set up in 1961 and giant panda is the official symbol of WWF.
- ✓ It was earlier called as world wildlife fund but in 1990 it was renamed as world wide fund for nature.

Role and Functions

✓ It helps to raise funds for urgent conservation requirements and promoting conservation through the world wide education campaign and public consciousness. Grants are raised by donations from public, heritable foundations, regular members, etc.

Other Institutions and Organizations

International Commission on Zoological Nomenclature (ICZN)
International Commission on Botanical Nomenclature (ICBN)
Global Tiger Forum (GTF)

✓ It is an International platform to discuss features pertaining to the protection of tiger population in the world.

Role and Functions

- ✓ Establishment of wildlife sanctuaries and national parks
- ✓ Establishment of special squad to discover poaching etc.
- **✓** Focuses on welfare of tiger-populations.

Tiger Conservation Society (TCS)

- ✓ Voluntary participation and raising of funds for conservation of tigers.
- ✓ Obtaining of international co-operation from countries known for existence of tigers.
- ✓ Improvement of tiger habitat and to promote conservation of tigers, ultimately.