Compendium
on
All India
Zoo Veterinarian Conference
on 3rd Feb. 2004

Sponsored by
Central Zoo Authority
New Delhi

Organised by
Lucknow Zoological Gardens
Lucknow
It is a pleasure and an honour to come to the All India Zoo Veterinarian Conference, organized by Lucknow Zoo and funded by the Central Zoo Authority, New Delhi. I have been told that Zoo Veterinarians from around 22 different states are attending this conference. Officers in charge of different Indian Veterinary Colleges have come here as resource persons to throw light on establishing linkages between Veterinary Institutions and Indian Zoos towards better health management of the animals.

It is very essential to keep our selves up dated with the latest techniques pertaining to restraint and translocation of wild animals. The basic aim for transfer of species from captive to captive conditions, wild to captive and wild to wild conditions is for the conservation, education, research and enrichment of wildlife diversity. Methods of capture, handling and transfer of animals needs very careful handling. Chemical immobilization of wild animals by expert Veterinarians facilitates their capture without involving much manpower and saves time. You are aware of the latest equipments for administration of drugs from remote distance in to the animal body.

Similarly, translocation of the animals, right from their capturing, loading, crating, transportation, unloading and release is a massive task. Translocation may lead to physical injuries and stress in animals and a Zoo veterinarian has to be very careful with these live animals.

Most of the Zoo Veterinarians, who have come here, must be well versed with the subject and others may gain by their experiences.

We are proud that Central Zoo Authority, New Delhi has selected Lucknow for the conference and I am sure that all of you will be greatly benefited at the outset.

(Surjit Kaur Sandhu)
Principal Secretary (Forests)
Govt. of U.P., Lucknow
Respected Principal Secretary (Forest), Govt. of U.P., Mrs. Surjeet Kaur Sandhu, distinguished guests, Zoo Veterinarians from all over India, ladies and gentlemen. I am pleased to be present here for the All India Zoo Veterinarian Conference, which is being organized for the first time in Lucknow. One on behalf of the Forest Dept., I welcome all our distinguished guests who have come here from more than 22 states to this historical capital of Uttar Pradesh. The topic to be shared by all of you today is developing skills in restraint and translocation of wild animals.

Chemical capture of wild animals is not easy task. There is likelihood of failure when a new chemical or technique is used. Since Veterinarians do not routinely use some of the modern immobilizing drugs, necessary expertise must be sought from knowledgeable sources. I'm sure that organizing such conferences where experts assemble from all over India, are very beneficial.

The main aim of transfer of wild animals within the Zoo or to others Zoos is done, as you all know, for improving the gene pool, or for breeding purpose or for providing mate to the single species. Wild animals are also restrained for medical and research purposes. It is very relevant for the Zoos in the present scenario as a majority of the exchange proposals within different Zoos revolve around this aspect.

Skillful handling is required for restraining the wild animals, either physically or mechanically or chemically. If not handled with care, the animals may be hurt & may come under stress.

I have been told that renowned scientists from various Veterinary colleges have also come here to participate in the conference. Your expert suggestions will be very useful in providing linkages between different Veterinary institutions and Zoos towards better health management.
Respected Principal Secretary Forest, Govt. of U.P. Ms. Surjeet Kaur Sandhu, Principal Chief Conservator of Forests, U.P. Sri Kaushalendra Prasad Saheb, distinguished delegates from various corners of the country, officers from the U.P. Forest department, colleagues from the media, ladies and gentlemen, I feel honoured to be here in this workshop on “Developing Skills in Restraint and Translocation of Animals in Zoos”. I take it as a privilege to say a few words on this occasion.

Zoos world over have come a long way from just being the collection of animals or menageries to the serious scientific institutions. If some of them have not, it is high time they do and play a major role in the arena of conservation.

Though the collection of animals was always patronized in one form or the other by the Indian kings and Maharajas, yet many European countries—especially after the Egyptian campaign of Napoleon—like France and Germany pioneered in designing and establishing the zoos, the way we know them today. In the middle of nineteenth century a number of major European cities vied with each other in establishing zoos, especially, once the gates of Africa and Latin America were open to them. The mega fauna of wondrous Africa so much fascinated the Europeans that zoo business became a major commercial activity and animal trade flourished in a big way in the latter part of the nineteenth century. Trapping parties were sent to Africa and other exotic places to fetch the animals in huge numbers. There came the professional companies that operated on international scale and could supply any number of animals on a price. Since the animals were in plenty, nobody cared even if they died in any number during trapping and transport operations. Sometimes the entire consignment perished during long transport and transshipment. Faulty packing and cursory handling of shipment resulted into serious injuries to the animals and many of them sometimes died on way to their destination. On the top of that many an animal did not survive in extreme and alien climatic conditions.

Wanton destruction of natural resources, their rapid depletion and extinction of many species forced to change our attitude towards zoos. They started playing major role in conservation, breeding of endangered species, research and education. They can no longer be treated as places of excitement and sources of cheap entertainment— not even the hub of cultural activities of the town. They are much more than that. In an age when there is a serious crisis of survival before many species and the number within the community is becoming critical, the role of zoos becomes pivotal in our strategy for conservation of nature and natural resources.

About a century back we plunged into the mistake of thinking that our natural resources were unlimited. We could take any number or any quantity from the nature. But history proved us wrong. Many a species became extinct or critically endangered in our own
the last decade, however, rapid development of injectable anesthetics in human and veterinary medicine plus improved delivery system have benefited everyone involved with animal capture. There have been many individual reports and publications on restraint, but no contemporary, single publication has incorporated these latest developments under one cover.

This conference is a chance for the zoo veterinarian, zoo manager and scientists to come together on one platform to emit expertise and share knowledge about the latest rules, advancement, researches and publications of new development in restraint and translocation.

(Eva Sharma)
Director
Lucknow Zoological Gardens
Lucknow
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Rescue Operation of Injured Wild Tiger at Rajiv Gandhi National Park and its Rehabilitation at Sri Chamarajendra Zoological Gardens, Mysore

Introduction:

A wild male tiger aged about 8 years, was seriously injured in its left fore limb by a Jaw trap laid by the poachers. Thanks to the Video footage taken by a Jungle Lodges Wildlife Tourist, which helped Forest Department Staff to conduct intensive combing operation and rescue the injured tiger, which was later shifted to Sri Chamarajendra Zoological Gardens, Mysore, to provide necessary treatment for its rehabilitation.

Rescue Operation:

On 31st May 2002 staff of Forest Department of D.B. Kuppe range noticed a wild tiger having an injury in its left fore limb & it was found limping. The video footage taken by wildlife tourist, was telecast in various news channels, clearly showing Jaw trap in the left fore limb. The Principal Chief Conservator of Forests (wildlife Preservation) Mr. Chakrabarathi, I.F.S., mobilized all the concerned staff, wildlife veterinarians & kumki elephants etc., to start the rescue operation. It was a challenging job to locate the injured male tiger because of the dense under growth of Lantana and other vegetation. On 2nd July 2002, Conservator of Forests, Sri Annur Reddy was able to track the injured tiger in the evening, but could not dart the tranquilizer as it was getting dark. On the 6th of June, 2002 morning, tribal trackers were able to find the den where wild injured tiger had taken shelter in Mastigudi section of D.B. Kuppe range. The den was ideally selected by the injured tiger and it was located very close to back water of kabin reservoir. Perhaps the tiger was surviving on water, as it is impossible to make kill due to serious injury in its fore limb.

The mouth of the den measured 2½ feet in width and it was graduating down to about 5 feet, which lead to a chamber sufficient to accommodate adult tiger. The mouth of the den was closed by spreading a net and observation was made. Though it was aggressive, it did not move on approaching the dens mouth. For safety reasons, Iron grill gate was used and placed over the net. This facilitated to look into the semi dark environment of the den under the torch light. We could see the head and the right limb. The injured left limb was covered. The animal was disturbed with the help of a pole and it moved exposing the left limb. It had a serious injury infested with maggots. Meanwhile two holes were
drilled from above into the den to allow more light for observation. The rescue cage was positioned and attached to the mouth of the cage and crackers were busted. Though it was agitated, it resisted to move. Water was poured in to the drilled holes to flush the tiger out in to the rescue cage but it didn’t work. It was getting dark. Therefore it was decided to tranquilize the animal. Dr. Khadri darted the tranquilizer to the right shoulder under the light of the torch. The symptoms of sedation was noticed within 10 minutes and then the tiger was noosed through shoulder & the neck and gently pulled into the rescue cage. It was around 8.45 p.m. the cage was slowly shifted with the help of the staff and loaded on the transporting truck. The wound was washed with antisepsic and examined. The trap had caused serious injury, severing all the toes along with the paw. A open septic wound contaminated with soil and infested with maggots could be seen. First aid treatment was provided. As the Tiger was fasting, since almost 6 days without getting any food due to the injury we offered 5 kgs of chicken, which it ate completely. The Conservator of forests, Madikeri circle Sri. Annur Reddy, I.F.S., & Deputy Conservator of Forests, Hunsur Division Sri. Annaiah, I.F.S., decided to shift the injured tiger to Sri Chamarajendra Zoological Gardens, Mysore for further treatment. The tiger was shifted to Mysore Zoo on the same night & reached the zoo at 3.00 a.m.

Treatment Attended At Mysore Zoo

On the 7th of June morning, it was tranquilized using Ketamine Hcl 600 mg & Xylazine 100 mg in combination injected manually as the animal was kept in the squeeze cage. Induction time 15 minutes, under sedation the injured limb was examined thoroughly. The wound was disinfected, maggots & dead tissue were removed. The wound was flushed with metronidazole & anti septic wokadine solution. Inflammatory condition of the affected limb was noticed & the animal had the fever, body temperature being 104.50 F. It was decided to treat the animal with antibiotics, analgesic & anti-inflammatory agents to control the infection, before taking the surgical amputation of the affected limb. The infection was brought under control by giving Megamycin (amoxacylin) + (cloxacylin) 1.5 gms twice a day I/M along with voveran (diclofenac sodium) 1mg per kg body weight I/M two consecutive injections in two days was provided.

On the 3rd day, the body temperature returned to normal 100.50F & inflammation of the limb also got reduced. Daily dressing of the wound was attended. On 14th June, it was decided to amputate the affected limb at the lower end shaft of radio-ulna bones.

Amputation of the Affected limb

A team of doctors Dr. Vasanth Shetty, Professor, Dept. of Surgery, Dr. Ranganath Asst. Professor, Dept of Surgery, Veterinary College, Hebbal, Bangalore, Dr. Shadakshar Murthy & the zoo veterinarians Dr. S.C. Valandikar, Asst. Director & Dr. S. S.M.S Khadri, Veterinary Officer attended the surgery of the injured wild tiger. The tiger was sedated using Ketamine Hcl 700 mg & Xylazine Hcl 200 mg (estimated weight of the tiger 150 kgs). Under sedation it was shifted to the operation theatre. Mobile x-ray unit was mobilized from Mysore Race Club equine dispensary & radiographs of the affected limb was taken before conducting the operation.

Zoo vets Dr. S.C. Valandikar & Dr. S.S.M.S Khadri monitored the anesthesia, pulse, respirations & body temperature, while Dr. Vasanth Shetty, Associate Professor conducted amputation of the injured limb at radio-ulna at lower end of the shaft. Supplementary dose of tranquilizer was necessary, ketamine 100 mg & xylazine 25 mg was injected to prolong the sedation for completing the surgical operation. It took about 2 hours & 10 minutes to complete the amputation of the affected left fore limb. Noticing the recovery symptom like twitching of ears &
palpebral & pupillary reflexes, the tiger was immediately shifted from operation theatre to squeeze cage. For revival procedure, Antagozil 2.5 ml & Doxapram 2 ml was given I/M. After about 20 minutes, the animal recovered from sedation & took to the sternal recumbency. Postoperative care & treatment was continued & it took about two weeks for healing of the surgical wound & later another two weeks for its complete recovery. The animal is keeping good health & its appetite is normal. 10 kg of beef, 1 kg chicken & about ½ kg liver is being provided (liver twice in a week). Hygienic environment is provided all around the squeeze cage to avoid flees, which may cause maggots infestation.

Rehabilitation

The rescued wild tiger is presently housed at Mysore Zoo and can be exhibited after creating necessary exhibit facility for educational purpose to bring awareness among the zoo visitors to convey the information of the danger being caused by the poaching of wild animals for their skin & bones. The jaw trap used for the attempted poaching of this wild tiger will also be displayed in front of the exhibit for it may convey the message of the seriousness that this species is going towards extinction unless and otherwise protection & conservation measures are seriously taken.

Acknowledgement:

We sincerely thank the team of surgeons, Dr Vasanth Shetty, Dr. Ranganath & Dr. Shadakshar Murthy of Veterinary college Bangalore & Govt. Poly clinic Mysore, for their co-operation in surgical intervention in amputation of fore limb of Royal Bengal Tiger.
Chemical Restraining of a Gaur (Bos gaurus) for treatment of Actinomycosis at Sri Chamarajendra Zoological Gardens, Mysore

Introduction:

Actinomycosis or lumpy jaw commonly noticed in cattle population, is also found among the wild gaurs and other herbivores. A case has been noticed in an adult male gaur aged about 6 years, robust and well built in its health condition and a proven sire, which has bred four calves in 2003.

A Case Study:

The keeper of the enclosure reported swelling on the right side of the mandibular region. The animal was kept under observation and tentative diagnosis was made as actinomycosis (lumpy jaw). The swelling started growing in its size and became a large lump without involving tongue in a period of 30-40 days. Tetracycline was given @ 4grams per day for seven days. But no desired response was noticed. Hence it was decided to dart the animal on 24-1-2004. Necessary preparations were made to mobilize sodium iodide for the treatment purpose.

Chemical Restraining:

The animal was darted using short-range projectile pistol, 5ml dart syringe was selected and red charge ejection was used. Combination of drugs Xylazine Hcl 60mg and Immobilon 1ml(2.24mg/ml) mixed together and darted to the neck region. After 6 minutes of darting, ataxia with head downwards appeared. No excitement and the animal came down to sternal recumbency at the 10th minute. The animal was manually approached and shifted to holding room. Necessary treatment with sodium iodide 20gram powder mixed with 50ml of distil water, was given subcutaneously in three sites and long acting oxytetracycline Hcl 200mg/ml, 30ml was injected deep I/M. The lump was opened, drained the yellow pus and collected the material for laboratory examination. The lab report confirmed the diagnosis of actinomycosis showing filamentus branching type.

Revival Procedure:

The animal was revived with Revivon 1ml I/M, Romaverm 5ml I/M, and cold water was poured over its body to cool down the body temperature (1020F - normal being 1010F). The animal became alert, showed eye pupillary reflexes, ear, tail reflexes and
movement of both fore limb and hind limb noticed and stood to its limbs after 10 minutes of giving Revivon & Romaverse.

Result:

On 3rd & 4th day of treatment we could appreciate reggration of mandebular swelling to almost 70%. Tetracycline Hcl 75 grams powder per day mixed with feed and given, and aqueous solution of sodium iodide 20 grams mixed with 50 ml of distill water given subcutaneously every week and further treatment is due.

Conclusion:

The case of actinomycosis has been recorded for the first time in a adult gaur {Bos gaurus} in Mysore Zoo. The response to the treatment is good and it needs surgical intervention to open the abscess and to treat the case under observation.

Acknowledgement:

Thanks are due to our Executive Director, Sri Kumar Pushkar IFS for the encouragement and providing facility to attend the case.

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Transquilization & Tethering of Musth Indian Elephant "Ganesha" at Sri Chamarajendra Zoological Gardens, Mysore, A Case Report

Introduction:
In Musth, the male adult elephant pose a big problem to mahout and Zoo Managers, due to their aggressive behaviour. They cause severe injuries stampede and even death to near by attendants like animal keepers & mahout. There are many such incidences where elephants went wrong and became uncontrollable. Therefore it is very important to control aggressive elephants by chemical tranquilization /immobilization.

A Case study:
Ganesha, an Indian elephant aged 25 years, presented by the Manthralaya Math to this zoo is a robust and well built animal, weighing around 3½ tons, had become uncontrollable and aggressive on the morning of 25-01-2004. He even mated the female elephant Padmavathi, may be in oestrous. The animal keeper reported of its aggressive behaviour and attack on him, who escaped narrowly. Observation was made, both temporal glands had the swelling and secretion was found oozing out. Therefore it was decided to tranquilize/immobilize the elephant for tethering purpose.

Methodology:
At 09:45 a.m., prepared the dart syringe with Xylazine Hcl 3.5ml & darted the animal using shortrange projectile pistol. After about 20mins of induction time, mild relaxation of tail, trunk & ear was noticed, but still animal was alert and could not manually approach it. Second dart was made at 10:30 a.m., with the supplementary dose of Xylazine 1.5ml and allowed further 20 minutes. Movements of tail, trunk & ear diminished and snoring could be heard. On manual approach still it was showing reflexes and was showing its trunk though in a relaxed manner. At this juncture it was decided to use Immobilon 0.3ml at a very low dosage (Etorphine Hcl 60mg & Acepromoazine maleate 3mg). At 10:50 a.m., prepared the dart syringe with Immobilon and darted the animal. After about 7 minutes of induction time loud snoring could be heard animal was totally stand still and no movements of tail, trunk & ears was found. It was then possible to approach the animal at 10:57 a.m. and applied the necessary chains in both hind & fore limbs and tethered the animal. At 11 a.m. it came down to right
lateral recumbency. Removed all the dart syringe from the body and applied betadine solution and injected menomycin forte in to all the three dart syringe sites to avoid the infection into the darting site. After securing the animal revival procedure was started by giving Revivon 0.5 ml. I/V and Romaverse(Yohimbine Hcl )5 ml I/M & 5 ml. I/ V. Liberal water was poured over the body of the animal to bring down the temperature(1000F), normal being 980 F. Pupillary reflexes and trunk movement noticed after 7 minutes of giving Revivon & Romaverse. The animal got up to its limbs after 30 minutes.

Conclusion :

Captive elephants under musth conditions in Zoo situation can best be attended by darting the drug in combination of Xylazine Hcl and immobilized for getting desired results for necessary tethering the elephant to avoid the risk from musth elephants to the keepers, mahout and other zoo workers. Xylazine as the base drug and appropriately selecting Etorphine Hcl with Acepromazine at low level gives wonderful results. In the present case 500mg of Xylazine and 0.3ml (60mg) of Immobilon made the tusker to snore in the standing posture and manual approach was possible and chaining the feet was attended. Later the animal came down to sternal recumbency and then to lateral. Revived the animal using Revivon 0.5ml I/V and Romaverse 5ml I/M and 5ml I/V revived within 30 minutes.

Acknowledgement :

Thanks are due to the Executive Director, Sri. Kumar Pushkar I.F.S. for providing opportunity to immobilize the musth elephant for chaining purpose.

Reference :


Immobilization & Translocation of 40 Sambars carried out at Sri Chamarajendra Zoological Gardens, Mysore

Introduction:

- Mysore Zoo is exhibiting different species of deer & antelopes.
- It includes endangered species like Brow antlered deer, Swamp deer, Muntjac & Four horned antelope.
- The climatic conditions at Mysore and the enclosure environment are conducive for the successful breeding of deer and antelopes.
- The population of the Deer and Antelopes increased tremendously over a period of time.
- This resulted in competition for feeding and breeding & space within the enclosure.

Methodology:

- Chemical capture & translocation of Sambars.
- 40 Immobilisations of which 32 for translocation & 8 for shifting was conducted.
- Drug used – Immobilon (Etorphine Hcl 2.24 mg/ml + Acetylpromazine 10 mg/ml)
- Estimated body weight
  a. Adult male 150-200 Kgs.
  b. Adult female 100-150 Kgs.
- Drug dosage – 2.264 mg/animal (1.1 ml of the drug).

Equipment used:

- Dist inject long range projectile gun.
- Dist inject short range projectile pistol.
- Dart syringe barrel size 3ml/5ml.
- Syringe charge 1-5ml.
- Ejection charge Blue (1-12m) & Red(10-12m) for pistol.
- Ejection charge Brown(20-35m) & White (30-50m) for gun.

Injection site & Drug action:

- Neck – Shoulder – Rump site.
- Induction time 7-10 min (mean – 7 min).
Immobilisation symptoms.
- Isolation from the herd. – 1st minute
- In coordination of limbs – 3rd minute
- Ataxia. – 4th minute
- Closing of eye lids. - 5th minute
- Sternal recumbency with neck up. – 5th – 7th minute
- Lateral recumbency with groaning. –7th–10th minute
- Stage of complete Immobilisation.

Approach to the immobilised animal:
- Approach the animal when it is completely down after the induction time of 10th minute.
- Use water to wet the body of the animal in case of hyperthermia.
- Use stature for shifting the animal to transporting vehicle.
- Keep the neck & head of the animal at higher level to avoid aspiration of ruminal content.

Revival procedure:
- After shifting of the animal to the transporting vehicle check for the vital function of the body.
- Revive the animal with Diprinorphine Hcl 5mg I/M or I/V depending upon the condition of the animal.
- Use life saving drugs only when required.
- Recovery time 5-7 min for gaining righting reflexes.

Precautions for Immobilisation procedure:
- Do not give roughages a day earlier.
- Do not feed concentrates in the morning.
- Do not dart advanced pregnant female.
- Do not use Etorphine in very young animals.
- Avoid darting stags in velvet.
- Remove stagnation of water inside the enclosure.
- Do not under dose the animal.
- Approach only when they are completely immobilized.
- Have sufficient staff for shifting the animal to vehicle.
- Vehicle cabin should be fully covered to create darkness and to avoid animals jumping out.

Translocation:
- Maintain 40 km speed.
- Most of the animals take sternal recumbency during the journey.
- Provide hay bedding in the transporting vehicle.
- Do not park the vehicle in the sun.
- Make observation of the animal intermittently.
- Take low traffic roads.
- Carry life saving & revival drugs and first aid kit.

Release in Herbivores Safari, B.N.P., Bangalore:
- Take the vehicle to a ramp for the convenient release of animals.
- Avoid causing stress – allow time to get the animals out.

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3. Zoo & wild animal medicine-1999 by Fowler & Miller
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Management of Tibial Fracture in African Elephant calf at Mysore Zoo

Introduction:
Fractures in wild animals in captivity are observed due to fall, infighting among the species or accidental etc., Mysore Zoo has both Asiatic & African Elephants, kept in separate enclosures side by side. We have one male and one female adult African Elephant, which gave birth to a male Elephant calf in the year 1994. The African Elephant calf, which was with Indian Elephant calves, was recently introduced to the Enclosure of African Elephants as one species.

A Case Report:
An African Elephant Calf named Richi aged about 9 years & weighing 1.5 tons born in Mysore Zoo, had an accidental fracture of left hind limb on 11th Sept 2002 causing simple Tibial fracture at middle portion of the tibia due to mounting of male adult African Elephant weighing about 4 tons who was noticed in the musth was trying to mount on the female but the calf intervened between them and the tusker mounted on the calf, which the calf could not bear the weight and had fallen down, receiving knee injury and fracture.

Diagnosis:
The calf showed lameness, pain & inability to use the limb & to sustain weight. Subsequently, swelling & crepitas at the place of fracture was observed. Examination & handling of the fractured portion showed tenderness & confirmed as a case of fracture of tibia.

Treatment:
Immediately, 21 rolls of Plaster of Paris (Gypsona) of 15cms cast was applied under mild sedation of Xylazine 100 mg I/m. The calf was tied in the enclosure without allowing to move away from the place. After about one & half month the leg showed malformation of callous, due to bending of the cast, causing bending of the leg inside. Therefore, it was decided to break the soft callous and reunite the broken Tibia by stretching the leg on 24th Nov 2002 under Immobilisation and to take necessary X-Ray before recasting with poly fiber Dura cast.

On 24th Nov 2002 at 7:30 AM, injected Immobilon 1.3 ml (2.912 mg) intramuscularly. After induction time of 10 minutes,
the animal slept on right lateral recumbency with profound sleep. Following observation were made:

At 8:10 AM:
1. Pulse 40 / Minute.
2. Respiration 8 / Minute.
3. Conjunctiva Pink.

Therefore we cut off and removed the Gypsum Plaster of Paris cast. Exposed the affected limb to the mobile X-ray brought there and developed the film. Clinically examined the limb, which showed hard callous formed at the site of fracture and could not be broken by hammer because of hardness and it left as such and decided to put another fresh Poly fiber Dura cast bandage.

At 8:40 AM again we examined the animal and noticed
1. Pulse 58 / Minute.
2. Respiration 7 / Minute.
3. Conjunctiva Pink.

Applied tightly 8 rolls of poly fiber Dura cast of 4" X 6" wide by dipping in warm water and wrapped around the fractured part over the padded cotton on the entire fractured portion forming a thick layer over it. The plaster bandage applied spirally and tightly. The Dura cast hardened quickly within minutes and remained as hard as possible. The animal revived with Revivon (Diprinorphine 1.8 ml [5.4 mg]) and it got up within 10-12 minutes. The following treatment was rendered to the ailing Elephant calf.
1. Voveran : 12ml Im. on first day.
2. Optineuron : 12ml Im. on first day.
3. Proxyvet (Diclofenac Sodium and Paracetamol Bolus-vet): 4 boluses orally through food, twice a day given for a week to reduce oedema & pain.
4. Vimerol : 5ml once daily for one month
5. Ostocalcium syrup: 30 ml twice a day for the entire period of healing for about 3 months as a Calcium supplement required for healing and callous formation.

Conclusion:
The movements of the animal restricted for further 1 ½ to 2 months. The animal was stall-fed and stationary to avoid breakage of callous. The animal assisted to rise and put weight on 14th Dec 2002. The calf was taken for a trial walk. No doubt, hard callus had formed, but because of non-alliance of fractured tibia properly as seen in the X-Ray film, the bending of the calf noticed. We have removed the Duracast on 31st Dec 2002. Slight limping of the left hind leg was still noticed. The calf rests on the ground intermittently, but it will not affect its normal life in walking. This is the first case of simple fracture in African Elephant and also Indian Elephant in Mysore Zoo, which was managed and treated successfully. The calf is leading its normal life of regular feeding and exercise in the enclosure with its parents.

Reference:
1. The Capture and care of wild animals-1973 by Dr. E.Young.
2. The chemical capture of animals-1976 by A.M. Harthoorn.
Mass
Tranquilisation
of
Spotted deer
(*Axis axis*) and
their shifting
to
Arabitttu
Reserve Forest

Introduction:
Sri Chamarajendra Zoological Gardens, Mysore is housing more than 375 spotted deers in 3 different enclosures. As they are prolific breeders, their population greatly increased over a period of time. Because of the over population, the infighting among the stags during the rutting season and competition for feeding and space resulted in increase in the mortality rate of the captive Spotted deer. To control their population, we had taken up castration of few selected dominant stags using Burdizzo castrator, under sedation. But it is not possible to control the prolific breeding of spotted deer in a high-density enclosure by this method. Hence a thought was given for the mass tranquilization of spotted deer and their shifting to isolated patch of Reserve forest, Arabitttu, in the out skirts of the Mysore city.

The over population of Spotted Deer, apart from causing stress and increasing the mortality due to infighting trauma, is very expensive to maintain them in captivity.

Methodology:
Tranquilization of deer for treatment, crating and other procedures is generally carried out using Ketamine HCl in combination with Xylazine. For mass shifting of 300 spotted deer, the regular procedure of darting each animal with said drug combination is cumbersome and very expensive. Each dart syringe along with said drug combination costs about Rs.2000.00.

The mass tranquilization of spotted deer using Diazepam (Valium 10 mg tab) was adopted at Sri Chamarajendra Zoological Gardens, Mysore. On trial basis, under control measures Diazepam was given 0.85 grams to 2 grams along with the food for each spotted deer (Harthoorn A.M. - (1976)). It was observed that Diazepam 2 grams brings ideal sedation, which allows manual restraining on approach. The symptoms of sedation could be noticed up to 36 hours and animals recover on their own. It was decided to take up field trials using Diazepam, at the rate of 2grams per spotted deer for achieving desired degree of sedation for shifting.

On 14th Nov 2002, Diazepam (valium 10mg tab) X 2000 tabs was mixed in five kgs of concentrate feed and made in to 10 equal parts and kept separately in a holding area. Six spotted deer 1:5
consumed the full quantity of the medicated food in the holding room. Symptoms of sedation like ataxia could be noticed after 45 minutes. After about 4 hours in coordination of limbs, drowsiness, half closed eyelids with bending of neck was noticed. Finally the deer could come down on the lateral recumbency after about six hours. Two of the female deer showed insufficient sedation, may be because they had taken partial quantity of the medicated food, and showed little resistance on manual approach. The said deer were given Ketamine HCl 1ml (100 mg) intramuscularly to achieve desired sedation. All the sedated deer were safely taken to the transporting truck and shifted to Arabitittu reserve forest.

On 15th Nov 2002, it was decided to feed medicated food in the afternoon around 4 PM to achieve desired degree of sedation by next day morning, which allows manual restraining with out causing stress and strain to the animals. Eleven spotted deer were taken to the holding room and given medicated food at the rate of 2 gram Diazepam per animal. Next day morning (16th Nov 2002) at 7:30 AM observation was made. All the deer were showing good degree of sedation and allowed manual approach without any excitement. All the eleven (3:8) spotted deer were secured manually and taken to the transporting truck and shifted safely to Arabithittu Reserve forest.

The Arabithittu reserve forest has free ranging leopards, which unfortunately had the field day to attack six of the spotted deer, which were still not completely recovered from the sedation. As it had been noticed during the controlled trials that the sedation with Diazepam could continue even up to 36 hours. Hence the deer shifted under sedation can be taken to the holding area for at least 3 days and then they can be released to the free ranging habitat to avoid unnecessary attack by the carnivore animals.

After making necessary arrangements at the release point, mass tranquilization and translocation of Spotted Deer was started on 24th August 2003. So far we have translocated 181 Spotted Deers to Arabbi Tittu Reserve Forest. The operation was highly successful and the deers, which were shifted, are well settled in the Arabbi Tittu Reserve Forest. The mortality during procedure is mainly due to infighting trauma, which is around 5%.

Precautions:

- Benzodiazepines (Diazepam) brings drowsiness, stupor, ataxia and hypothermia.
- The affect of the Diazepam can last for 24 – 36 hours.
- Diazepam have a very high therapeutic index, even 5 – 10 times the therapeutic doses do not produce significant CNS depression, fatalities are rare.

<table>
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<th>Date</th>
<th>Species</th>
<th>M</th>
<th>F</th>
<th>U</th>
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<td>Deer Spotted</td>
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<td>6</td>
<td>13</td>
<td>0</td>
<td>19</td>
<td>4000</td>
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</table>

- Diazepam 2g / animal produces ideal sedation for manual handling, if animal consumes more than the therapeutic index even to the extent of 5 times the normal dose, it is well tolerated and does not result in fatality.
- The action of the drug is delayed because the deer are ruminant animals.
Conclusion :

Mass tranquilization of the spotted deer using Diazepam is cost effective method to shift surplus population of spotted deer with out causing stress, strain, excitement and injuries to the animals. The methodology adopted at Sri Chamarajendra Zoological Gardens, Mysore has given a very successful beginning, in shifting 181 spotted deer to isolated patch of reserve forest of Arabithittu. Less than 5% mortality has been recorded during the translocation operation. The mass sedation using Diazepam can be safely employed in various Zoos, safaris and deer parks for the safe shifting of surplus stock of spotted deer in the country.

Reference :

1. Dr. Young .E (1973) - The Capture and care of wild animals, South Africa Nature foundation (Affiliated to World Wildlife Fund), Pretoria South Africa

***
Mass Tranquilization of Black Bucks (Antelope cervicapra) and their Translocation carried out at Sri Chamarajendra Zoological Gardens, Mysore

Introduction:

Sri Chamarajendra Zoological Gardens, Mysore is housing more than 75 Black Bucks in 2 different enclosures. As they are prolific breeders, their population greatly increased over a period of time. Because of the over population, the infighting among the males during the mating season and competition for feeding and space resulted in increase in the mortality rate of the captive Black Bucks. To control their population we had taken up castration of few selected dominant males using Burdizzo castrator, under sedation. But it is not possible to control the prolific breeding of Black Buck in a high-density enclosure by this method. Hence a thought was given for the mass tranquilization of Black Bucks and their shifting to herbivores safari at Bannergatta National Park, Bangalore.

The over population of Black Buck, apart from causing stress and increasing the mortality due to infighting trauma, is very expensive to maintain them in captivity.

A Case Report:

Tranquilization of antelopes for treatment, crating and other procedures is generally carried out using Ketamine Hcl. For mass shifting of 25 Black Bucks the regular procedure of darting each animal with said drug is cumbersome and very expensive. Each dart syringe along with said drug combination costs about Rs. 2000.

On 13th October 2003 at 5p.m. the mass tranquilization of Black Buck using Diazepam (Valium 10mg tab) was attended at Sri Chamarajendra Zoological Gardens, Mysore, Diazepam 10mg tabs X 65(650mg per adult Black Buck) was given along with the food for each Black Buck (Harthoorn A.M. - (1976)). It was observed that Diazepam 650mg brings ideal sedation, which allows manual restraining on approach.

On 14th October 2003, sedated Black bucks were shifted to transporting vehicles, which was fully covered and inside environment was kept semi dark. The translocation journey took about 4 ½ hours to reach herbivores safari Bannergatta National Park. All the Black Bucks were safely released into the holding area and necessary treatment was provided for any minor injury. The Diazepam sedation lasted for about 36 hours and animals

Dr. S.S.M.S Khadri
Veterinary Officer
Dr. S.C. Valandikar
Asst. Director
Kumar Pushkar, I.F.S
Executive Director
Sri Chamarajendra Zoological Gardens, Mysore

All India Zoo Veterinarian Conference 3rd Feb. 2004
regained their righting reflexes and started moving.

**Precautions:**
- Benzodiazepines (Diazepam) brings drowsiness, stupor, ataxia and hypothermia.
- The affect of the Diazepam can last for 24 – 36 hours.
- Diazepam have a very high therapeutic index, even 5 – 10 times the therapeutic doses do not produce significant CNS depression, fatalities are rare.
- Diazepam 650mg/animal produces ideal sedation for manual handling, if animal consumes more than the therapeutic index even to the extent of 5 times the normal dose, it is well tolerated and does not result in fatality.
- The action of the drug is delayed because the antelopes are ruminant animals.

**Conclusion:**

Mass tranquilization of the Black Buck using Diazepam is cost effective method to shift surplus population of Black Buck with out causing stress, strain, excitement and injuries to the animals. The methodology adopted at Sri Chamarajendra Zoological Gardens, Mysore has given a very successful beginning, in shifting 25 Black Bucks to herbivorous Safari of Bannerghatta National Park, Bangalore. Less than 0.04% mortality has been recorded during the translocation operation due to Hypothermia as it had slept in stagnant rainwater. The mass sedation using Diazepam can be safely employed in various Zoos for the safe shifting of surplus stock of Black Buck in the country.

**Reference:**
1. Dr. Young E. (1973) - The Capture and care of wild animals, South Africa Nature foundation(Affiliated to World Wildlife Fund), Pretoria South Africa
Tranquilization and Translocation of animals in Tata Zoo, Jamshedpur

Translocation of Hippo male from National Zoological Park, New Delhi to Tata Zoo, during Jan. 96

Hippopotamus male, sub-adult was translocated from National Zoological Park New Delhi to Tata Steel Zoological Park, Jamshedpur, Jharkhand by truck during Jan, 96 in a special folding type of Steel transportation box. (Design as under)

The transportation box was fixed into the hippo enclosure and the food was placed inside the box daily keeping one side open and one side close. All animals were allowed to take food from that box. After a lapse of one week the selected male was trapped by closing the back gaps.

A 200 litre capacity water tank, dry ration such as wheat bran, black gram, oilcake, procured on the way to feed the hippo.

The animal was sprinkled with water during the day time every 2-3 hour during the journey. The animal was found standing and sitting during the journey. the speed of vehicle was maintained slow and late night halt was given due to heavy fog.

- The animal was caged on 20 Jan. 96 at 2.00 pm.
- The transport box was loaded on the truck by crane at 5.00 pm.
- Departure from Delhi - 8.00 pm on 20 Jan.96.
- Arrival at Jamshedpur - 11.00 am on 23 Jan. 96.
- Route was Delhi-Kanpur-Allahabad-Varanasi-Sasaram-Hazaribag-Ranchi-Jamshedpur.

The animal was unloaded by crane inside the Hippo enclosure itself and released soon.

Dr. M. Palit

Folding type Hippo Transportation Box (Size-9’X5’X5’)

All India Zoo Veterinarian Conference 3rd Feb. 2004
Blackbuck translocation from IVRI, Izat Nagar, Bareilly during March 96

2:4 Blackbuck were translocated from IVRI, Bareilly to Jamshedpur by truck during March 96.

The animal were captured from big enclosure using tranquillising gun (Xylazine and ketamin Hcl mixture 1:1 ratio 0.5 ml-1.00 ml l/m to each animal, 100 mg/ml concentration) at 2.00 pm was given.

All the animals were crate separately in transportation boxes and all animals allowed to revive inside the box and then loaded on truck.

Departure from Bareilly - 7.00 pm on 25 Mar.96
Arrival at Jamshedpur - 4.00 pm on 28 Mar. 96

The route was Bareilly-Sitapur-Lucknow-Varanasi-Shasaram-Barhi-Ranchi-Jamshedpur.

The animals were fed with soaked gram, Wheat bran, Green fodder and tree leaf during the journey. Special care was taken on drinking water which was added with Herbal antistress syrup (Zee tress-Indian Herbs, Antistress formula-Allembic) and multiple electrolyte powder (Vitosil-Brihans Lab)

Translocation of Sloth Bear adult from Assam State Zoo, Guahati to Tata Zoo, Jamshedpur by truck during the Nov, 95.

The animal was caged in specially designed transportation box made of angle iron frame with steel iron sheet on inner lining and wooden plank fixed on outer surface (Design of the cage given below) on 13-11-95 at 2 pm and was loaded on truck 7.00 pm on 13-11-95.

The bear was fed with milk (Pasteurised packed milk) and sliced bread, Banana, Cucumber and plenty of water along with oral rehydration powder (Vitosil-Brihans Lab Electral powder) during the journey.

The accompanying animals on the vehicle were Hog deers-4 and Barking deers-6.

Departure from Guahati - 6.00 am on 14-11-95
Arrival at Jamshedpur - 11.00 am on 17-11-95

The route was Assam-Siliguri-Dalkola-Katihar-Barouni-Kadoroma- Hazaribag-Ranchi-Jamshedpur.
Translocation of Hog deers from Assam State Zoo, Guahati to Tata Steel Zoological Park, Jamshedpur by truck during Nov. 96

The animal were immobilised from enclosure by using xylazine and Ketamine HCl 100 mg concentration each 1:1 mixing ratio, 1.00 ml-1.5 ml l/M by a dart gun and caged in wooden transportation box at 3.00 pm on 13-11-95. The animals were allowed for revival in the box, feed and water were also kept in the box. The boxes were loaded on the truck at 9.00 pm on 13-11-95.

Departure from Guahati - 6.00 am on 14-11-95
Arrival at Jamshedpur - 11.00 am on 17-11-95

Translocation of Camel male sub adult from Alipur Zoological Park, Kolkata to Tata Zoo, Jamshedpur during March 99

The animal was immobilised using xylazin and Ketamine HCl mixture 1:1 ratio (4.00 ml l/M, 100 mg/ml concentration each) at 2.00 pm. The animal was loaded on the truck at 3.00 manually, the limbs were tied with cotton rope in sitting posture. The animal was found revived partially at 6.00 pm. The animal was allowed to take small quantity of food and water before journey also. The animal was fed with soaked black gram, wheat bran, banana etc. Water added with electrolytes was given during the journey.

Departure from Kolkata - 8.00 pm on 9-3-99
Arrival at Jamshedpur - 11.00 pm on 10-3-99

The Camel was translocated by truck without use of any transportation box but was tied with rope in sitting posture throughout the journey. The floor of the body was heavily padded with paddy straw.

Translocation of Emus 2:2 from Hyderabad during the year 99 by train and truck.

Four no. of 14-16 months old sub-adult Emus were captured manually from enclosure and caged in four cages at 8.00 am on 5-7-99 at Emu farm at Secunderabad and were brought to Railway station by truck. The boxes were kept in the break-van of the train (which was booked in advance). The cages were designed in such a way that all the four cage can be put in a single break van properly and also according to size of doors of van and the size of the bird. One keeper was also allowed to accompany the bird in the same break van so that birds can be looked after properly. Dry ration and drinking water added with multiple electrolytes was provided to the birds during the journey. The door of the van was also kept open so that suffocation can be avoided.

Departure from Secunderabad - 2.00 pm on 5-7-99
Arrival at Khargpur - 5.00 pm on 6-7-99
Departure from Khargpur - 8.00 pm on 6-7-99
Arrival at Jamshedpur - 9.00 am on 7-7-99

Flat Iron Grill 20 X 5 mm
Angle Iron Frame
Welded Mesh 1”X1” gap
10 mm Ply Uplift Door
Coin size hole

Emu Transportation Box

All India Zoo Veterinarian Conference 3rd Feb. 2004
Translocation of Crocodile from Nandan Kanan Biological Park, Bhubaneswar to Tata Zoo, Jamshedpur

1:3 no. of 1.5 metre size Gharial and 1:1 no. of Caiman crocodiles were translocated from Nandan Kanan Biological Park during Feb.97.

The animals roughly 1.5 metre in length and were captured manually by using gunny bags and caged in transportation box (design as under) at 4.00 pm on 7-2-97. The boxes were loaded on vehicle at 6.00 pm

Departure from Bhubaneswar - 8.00 pm
Arrival at Jamshedpur - 8.00 am

Crocodile Transportation Box (Size 6’6” X 18” X 18”)

***
Tranquilization of Male Sloth Bear

ABSTRACT

History of cannibalism in captive bears is very rare. One male Sloth Bear in Bear Safai, Bannerghatta Biological Park, Bangalore – 83 had attacked and killed two female sloth bears. The male bear was found to be eating the external genitalia of the female bear. Hence the bear was darted to be kept in holding house. The animal was darted from a distance of 20 feet using Dist-Inject syringe powered by brown charge and propelled by Dist – Inject gun model No 60. The bear was darted at the neck muscles. Xylazine-Ketamine mixture @ 3 mg / kg and @ 8 mg / kg IM respectively was used for immobilization of the sloth bear. Vomition was observed in five minutes post injection of the mixture. After 15 minutes the bear was found to be immobilized, adequate safe for handling. The bear was restrained physically using ropes tied around the shoulders and brought back to the holding house.

Srinivasa Murthy G
Asst. Director

Dilip Kumar Das
Veterinarian

NL Raghava
Asst. Conservator of Forests

Markandaiah KB
Executive Director

Bannerghatta Biological Park
Bannerghatta Post, Bangalore
Karnataka.
Tranquilization of Sloth Bear:

Bear Safari was started in the year 2002-2003 at Bannerghatta Biological Park.

- Area - 36.35 acres
- Total number of animals in Bear Safari - 22 nos.
- Male - 13
- Female - 9

Purpose of Tranquilization

- Psychological disorders
- Cannibalism in the captive adult Sloth Bear

Animal darted from a distance of 20 feet powered with brown charge at neck region.

After dart animal moving towards holding house.

Bear sedated 20 min after darting, note the posture of bear.

Bear brought back from moat to crawl area.

Male Sloth Bear feeding on the carcass of female sloth bear.

Another female sloth bear killed by the same male sloth bear.
Hand rearing of EMU Chicks at Arignar Anna Zoological Park, Vandalur

Emu, the second biggest bird in existence, is native of Australia. Arignar Anna Zoological Park received 1:1 Emu chicks of three weeks old. The chicks were initially released in a 15 feet x 15 feet sand filled, chain link covered yard. The chicks started to peck and swallow very small pebbles and sand particles. In order to avoid any problem caused by the foreign bodies, very fine sand was filled in the yard and a layer of the same was removed once in a fortnight to avoid faecal contamination. Initially the chicks were fed with germinated green gram, soaked wheat and greens. Broiler starter mash and cooked rice in milk were added gradually. To avoid wastage, feed and water were provided in hanging trays so that the birds can consume with ease. Over feeding was avoided to prevent skeletal deformities. Faecal examination and deworming were done once in a month. After they attained six months of age, the birds were released into the flightless birds enclosure of the zoo and they continue to enjoy the new environment.

***

K.Senthilkumar
K. Divaki
Veterinary Assistant Surgeons

R. Thirumurugan
Zoo Veterinarian

Pathan Nazrullah Khan
Veterinary Officer
Arignar Anna Zoological Park,
Vandalur, Chennai
Tamilnadu
Experiences on Capture and Translocation of Elephants and Rhinoceros from field

Why capture them?
- Treatment
- Biological research
- Rescue operation
- Planned breeding
- Control of rogues
- Biotelemetry
- Translocation

Why translocation?
- Population management-
  Over population-Carrying capacity
  Small population-Inbreeding, unsustainable
- Building back-up populations
- Relocate stray animals

Problems of the operation
- Very expensive
- Expert team is required
- Elaborate preparations are necessary
- Very little margin of error
- Animals come back
- Translocated animals are not accepted by the resident herd.

Dr. Kushal Konwar Sarma
Ph.D.
Associate Professor
Surgery & Radiology, CVSc, AAU, Guwahati, Assam

Past experience
- Asian elephant
  Malaysia (1974-1988)
  Sri Lanka (1979)
  Karnataka (1987)
  Tamilnadu (1986)
  Assam (1999, 2002)
Great Indian one-horned rhinoceros
Sale & Woodford (1981)
Nepal- ongoing

ANIMAL SPECIES
- Preparedness
- Individual or herd behaviour
- Physical drive vs Chemical restraint & motorized transportation

Syringe projector
- Projector type and condition- Dist inject long range projector
- Gun powder blanks/ pneumatic
- Reusable metal darts
- Appropriate needle

Drug protocol
- Immobilizing: Etorphine, Carfentanyl, Xylazine, Medetomidine, Romifidine
- Sedative: Xyl., Mede., ACP,Halo
- Reversal:Dipre., Yohim., Atipamezol
- Human antitode:Narcan, Adrenaline, Atropine
- Antistress:Vit.E,Zinc, Selenium
- Myopathy: Sodi-bi-carb inf,Athistt.,NSAID
- Analactics:Doxapram, Nickethemide
- Antishock: Dexa or Betamethasone
- Long acting Ab.Antiseptics & TT

Darting protocol
- Correct approach
- Darting platform

- Darting field
- Darting areas in the body
- Approaching the darted animal

Immobлизed animal
- Ensure Immobilization before handling
- Eye ointment,blindfold
- Monitor vital functions and correct
- Collect darts and preserve, dress
- Maintain airways
- Apply physical restraint
- Radio collar, Blood sampling, Measurements

Loading
- Sledge the rhino into the box cage, reverse immobilization
- Push sedative in the elephant, place koonkies and reverse immobilization
- Load into the truck in reverse
- Transport (40km & 30km)

Transportation
- By road- max. 40 km for rhino, 30 km for elephant.
- Pilot car.
- Veterinary car.
- By air.
- By water.
- On foot.

Release
- Appropriate release site
- Post release monitoring

***
Centre for Wildlife Conservation and disease Surveillance

Main Activities
- Health monitoring and disease surveillance in free and captive wildlife
- Identification and characterization of wild mammalian species
- PG Teaching relating to wildlife health management (NDZWM)

Infrastructure
- Scientific staff: 1 + 6 collaborating scientists
- Technical: 1
- Ministerial: 1
- Supportive staff: 4
- Laboratory: 2 + lab facilities of collaborators
- Deer Park consisting of 33 animals
  - Black buck - 8
  - Chinkara - 1
  - Hog deer - 1
  - Nilgai - 4
  - Spotted Deer - 19

CZA Funded Scheme
Title: Development of disease diagnosis and forensic facilities for captive and free range wild animals

Project Leader: Dr M. P. Yadav
P. I.: D. Swarup/ I/C CWL
Collaborators: G. R. Singh
            A. K. Sharma
            A. K. Tiwari
            R. C. Patra
            A. G. Telang

Objectives
- To investigate and provide diagnosis of diseases in captive and free range wild animals
- To develop molecular biology techniques for identification of wild species

Dr. D. Swarup
Incharge,
Centre for Wildlife,
Indian Veterinary Research Institute
Bareilly
Practical Utility

- To meet the demands for expert diagnostic and forensic facilities to National Zoological Parks and forest department in the country

Activities

- Development of infrastructure and renovation of existing facility to establish diagnostic and forensic laboratory
- Creation of museum of gross pathological specimens and species-wise cataloguing of bones from wild animals
- Attending wild life disease outbreaks and extending the clinical health services
- Necropsy examinations of carcasses and histopathological diagnosis of morbid specimens received
- To generate normal haemato-biochemical parameters in different wild species
- Standardization and use of molecular biology techniques (RAPD-PCR/nucleic acid hybridization) for wildlife species identification
- Identification of bones and other material of wild life for forensic purposes

Activity assigned

- Post mortem & Histopathological examinations (Dr AK Sharma)
- Radiological examination (Dr GR Singh)
- Biochemical/serological/toxicological examinations (Dr Ag Telang/Dr RC Patra, Dr D Swarup)
- Disease investigation and consultancy (Dr D. Swarup, and other specialists)
- Biotechnological methods (Dr AK Tiwari/Dr Mohini Saini)

Services rendered

- Disease diagnosis
- Clinical examination
- Postmortem & histopathological examination
- Radiology
- Forensic aids
- Wildlife Disease management and other advisory services

Main users / linkages

- Zoological parks- Delhi, Lucknow, Kanpur, Nainital
- National parks- Dudhwa, Ranthambor
- Wild life Range & Forests Departments-Wildlife range Kartaniaghat (Baharaich), Forest caretaker Wild Animals Gonda, Social Forestry Deptt. Bareilly, Shahjahanpur and Badaun, ForestDeptt. Haldwani, Haridwar, etc.
- Others- Wildlife Trust of India, Chambal Century Project Agra, Judiciary (Through forests Deptt.)

Post mortem Examinations
(1-4-2001-31 to 12-2003)

<table>
<thead>
<tr>
<th>Animal Species</th>
<th>No of PM</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger</td>
<td>13</td>
<td>Traumatic injury (5) NSD(8)</td>
</tr>
<tr>
<td>Leopard</td>
<td>3</td>
<td>Traumatic injury (2) NSD(1)</td>
</tr>
<tr>
<td>Deer</td>
<td>4</td>
<td>NSD</td>
</tr>
<tr>
<td>Black Buck</td>
<td>3</td>
<td>Traumatic injury (2) NSD(1)</td>
</tr>
<tr>
<td>Rhinoceros</td>
<td>1</td>
<td>Traumatic injury</td>
</tr>
<tr>
<td>Neelgai</td>
<td>1</td>
<td>NSD</td>
</tr>
<tr>
<td>Turtle</td>
<td>1</td>
<td>NSD</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td></td>
</tr>
</tbody>
</table>
Histopathology
(350 samples from 77 animals)

<table>
<thead>
<tr>
<th>Species</th>
<th>No.</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger</td>
<td>6</td>
<td>Hepato-renal deg. (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parasitic granuloma (1)</td>
</tr>
<tr>
<td>Lion</td>
<td>2</td>
<td>Interstitial nephritis (1)</td>
</tr>
<tr>
<td>Python</td>
<td>1</td>
<td>Focal necrotic hepatitis(1)</td>
</tr>
<tr>
<td>Red Leche</td>
<td>1</td>
<td>Acute serous bronchopneumonia</td>
</tr>
<tr>
<td>Black buck</td>
<td>5</td>
<td>Tarsal gland hyperplasia (1)</td>
</tr>
<tr>
<td>Squirrel monkey</td>
<td>2</td>
<td>Suppurative myositis (1)</td>
</tr>
<tr>
<td>Swamp deer</td>
<td>2</td>
<td>Neohrosis (1)</td>
</tr>
<tr>
<td>Lion-tailed monkey</td>
<td>1</td>
<td>Hepatosis (1)</td>
</tr>
</tbody>
</table>

Forensic services

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Received from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin of tiger (4)</td>
<td>CIM Rampur</td>
</tr>
<tr>
<td></td>
<td>CIM Lakhimpur Khiri</td>
</tr>
<tr>
<td>Elephant tusks/ teeth (2)</td>
<td>Forests department Pilibhit</td>
</tr>
<tr>
<td>Skin of deer (2)</td>
<td>CIM Rampur</td>
</tr>
<tr>
<td>Tiger bones &amp; skull(4)</td>
<td>Tiana Tanda, Rampur</td>
</tr>
<tr>
<td></td>
<td>Forest Deptt. Pilibhit</td>
</tr>
<tr>
<td></td>
<td>Dudhawa National Park</td>
</tr>
<tr>
<td></td>
<td>FRO, Nawrangpur</td>
</tr>
<tr>
<td>Lion skin and bones (2)</td>
<td>CIM Lakhimpur Khiri</td>
</tr>
<tr>
<td>Teeth of Wild boar (1)</td>
<td>Dudhawa National Park</td>
</tr>
<tr>
<td>Bones of crocodile (1)</td>
<td>Dudhawa National Park</td>
</tr>
<tr>
<td>Legs &amp; feather of peacock</td>
<td>Forest deptt, Haridwar</td>
</tr>
<tr>
<td></td>
<td>Social Forestry deptt. Shahjanapur</td>
</tr>
</tbody>
</table>

Veterinary Consultancy

- Dudhwa National Park
- Mohinder Mohan Chaudhary Zoological park, Chhatbir
- Pt. GB Pant Zoological Park, Nainital
- Zoological Garden, Lucknow
- Kedarnath Vanya Jeev Prabhag, Gopeshwar

Center for Wildlife Conservation and disease Surveillance in the services of wildlife healthcare

Treatment Consultancy of ailing tiger
- Director Lucknow Zoo requested for vet consultancy to white tiger having bleeding from left canine
- The biopsy indicated squamous cell carcinoma of mild degree
- Radiographic examination taken by us revealed aggressive and osteolytic nature of lesion suggestive of osteolytic osteosarcome/squamous cell carcinoma of sever nature
- Serum biochemistry indicated involvement of kidney and liver
- Treatment (cyclophosphamide 50mg/m2orally for 3 days/week for 4 week+ Mesna 2ml + prednisolone 10 mg daily for first week prolonged survival

Identification of crocodile bones
- Specimens of skull bones received from Forest officer Haridwar
- On basis of morphologic (18 and 15 teeth upper lower side and largest fifth maxillary tooth) and radiographic examinations, bones were identified as that of muggar (Crocodylus palustris)

Identification of tusk and teeth bones
- Seven specimen received from DFO Pilibhit
- Identified on the basis of morphological (presence of cemented ridge, and texture of dentine similar to molar teeth of an elephant) and radiographic examination (homogenous dense radiographic density suggestive of dense tissue of animal origin)
Identification of Legs of Indian Peacock (Pavo cristatus)

- Specimen received from forestry Deptt. Shahjahanpur
- Identified on the basis of morphological (presence of pointed spurs in distal third of shank, long tarso-metatarsus and short blunt and strong claws), and radiographic examination (confirming presence of leg bones).

Future activities /linkages

- Continuing consultancy services indicated above
- Establishing normal hematobiochemical profile of spotted deer and black buck for use as reference value
- Developing biotechnological methods to characterize meat/tissue samples of Deer vs cattle and buffaloes and other wild animals vs related domestic species
- Purchase of equipments

Funding

- More funds are required to continue the project for one more year
- CZA is requested to consider additional funds of Rs 4 lakh to continue the post of 2 RA and purchase of essential consumables

***
Enrichment of Technical Liaisonship between Zoos & Veterinary Research Institution

TEAM APPROACH FOR MOST OF THE PROBLEMS—ADAPTED AS A BASIC STEP
Clinical signs Wild animals! (often unpredictable)
Biology—a speciality! 21
Immobilisation—a problem
Treatment—again problem
Factors involved:
Zoo + vet.research inst.

FACILITATING OPPORTUNITIES FOR LIAISONSHIP
TRAININGS
PROJECTS
CURRICULUM WORKS IN VCI SYLLABUS
CLINICAL BACKGROUND
INTERACTIONS WITH ZOO VETERINARIANS & FOREST OFFICIALS INCLUDING ANIMAL KEEPERS

PROBLEM IDENTIFICATION IN ZOO SET UP
• AN OPEN TYPE OF INTERACTIONS
• REVEALING OF PROBLEMS PRECISELY AND FRANKLY
• UNDERSTANDING OF MANAGEMENT ISSUES
• INTERACTIONS ON VETERINARY INFORMATIONS FOREST OFFICIALS FRANKLY
• NET APPLICATIONS (BASED ON UTILITIES!)

SPECIFIC CHANNELS FOR ENRICHMENT OF LIAISONSHIP
PROJECT:
• STRENGTHENING OF MADRAS VETERINARY COLLEGE AS NODAL CENTRE OF WILDLIFE HEALTH AND DISEASE DIAGNOSIS
• FIELD LEVEL COOPERATION & ASSISTANCE
  • ZOO DIRECTORS
  • VICE CHANCELLOR OF TANUVAS

Dr.M.G. Jayathangaraj
Ph.D., D.WL.Mgt.
Associate Professor & Head, Dept.of Wildlife Science, Madras Veterinary College Chennai-7

All India Zoo Veterinarian Conference 3rd Feb. 2004
OBJECTIVES OF THE PROJECT

- Clinico-pathological and physiological analysis
- Toxicology, metabolic and nutritional analysis
- Microbiological and serological analysis and preventive care
- Clinical diagnosis by non-invasive diagnostic equipments and methods

- TOXACARA SP. WORMS IN FELIDS
- APONOMMA SP. TICKS IN COBRA AT ZOOLOGICAL PARK
- METABOLIC BONE DISORDER OF MUGGER
- STAR TORTOISE AT AMRIDI ZOO
- AUTOPSY OF CHIMPANZEE AT ZOOLOGICAL PARK
- LESION DUE TO FRACTURE IN CHIMPANZEE
- STORNGYLOIDES STERCORALIS IN B.MACAU
- BALANTIDIUM COLI IN NON-HUMAN PRIMATE
- ANCYLOSTOME EGG IN CIVET CAT
- LIPOPTENA CERVIFLY IN CHITAL
- FEED ANALYSIS IN AAZP
- INTERACTIONS WITH ZOO VETS AT PARK
- EOSINOPHIL IN MUGGER
- GADGET FOR ZOO VETERINARIANS
- REVEALING OF ANATOMICAL FEATURES AT ZOO

ENHANCING RESEARCH ACTIVITIES FOR BETTERMENT OF WILD ANIMAL HEALTH CARE

- ENHANCING RESEARCH ACTIVITIES FOR BETTERMENT OF WILD ANIMAL HEALTH CARE
- AMPLIFIED STETHOSCOPE
- PRIMATE CAMP AT ZOOLOGICAL PARK
- PULSE OXIMETRY IN LTM
- PULSE OXIMETRY IN BONNET MACAQUE

Regional contributions will be Strengthened

CONSTRAINTS

Travel grant

Communications

CONCLUSION IN ONE WORD

- BOTH ZOOS & VETERINARY
- RESEARCH INSTITUTIONS
- HAVE BENEFITS!!

***
Resource Persons who attended the conference on 3rd Feb. 04

1. Dr. B. M. Arora
   President,
   Association of Indian Zoo and Wildlife Veterinarians,
   M-83 BDA. Colony,
   Tibri Nath Mandir,Bareilly.
   U.P. -243122

2. Dr. D. Swarup
   Incharge,
   Centre for Wildlife,
   Indian Veterinary Research Institute
   Bareilly.

3. Dr. K.K. Sharma
   Prof.
   College of Veterinary Science
   Guwahati.
   Assam

4. Dr. L.N. Acharjyo
   Retd. Zoo Veterinarian,
   Nandankanan Biological Park,
   Bhubaneswar.
   Orissa

5. Dr. M.G. Jayathangaraj
   Principal Investigator
   Dept. of Wildlife Science,
   Madras Veterinary College,
   Chennai.

6. Dr. N. Sahoo
   Officer Incharge
   Wildlife Health Center,
   Orissa Veterinary College,
   Bhubaneswar.
   Orissa

7. Dr. R.G. Jani
   Prof. & Incharge,
   Center for Wildlife Health,
   Veterinary College,
   Anand, Gujrat.
List of Veterinarians who attended the conference on 3rd Feb. 04

1. Dr. Avijit Biswas
   Veterinary Officer,
   Alipore Zoo, Kolkata.
   West Bengal.

2. Dr. Anil Sharma
   Veterinary Officer,
   Bhopal Zoo,
   Bhopal

3. Dr. B.S. Bhadashiya
   Veterinary Officer,
   Geer Foundation
   Indroda Nature Park PO. Sector -7
   Gandhni Nagar, Gujrat.

4. Dr. C.N. Bhuva
   Vet. Officer,
   Sakkarbaug Zoo,
   Junagadh,
   Gujarat.

5. Dr. C.S. Jayakumar
   Veterinary Officer,
   Thiruvanthapuram Zoo,
   Zoological Gardens,
   Thiruvanthapuram City, Kerala.-695033

6. Dr. Devendra Porwal
   Veterinary Officer,
   Kamla Nehru Prani Sangharahalaya Zoo,
   Indore Zoo,
   Indore, Navlakha,
   M.P.-452001.

7. Dr. Denesh Kumar Pradip
   Veterinary Officer,
   Bhagwn Birsa Biological Park,
   Doranda, P.B.No-41
   Ranchi
   Jharkhand-831001

8. Dr. G. Srinivasamurthy
   Veterinary Officer,
   Bannerghatta Biological Park,
   Bangalore.
   Karnataka-560083

9. Dr. J.B. Goswami
   Veterinary Officer,
   Ahmedabad Zoo
   Gujrat.

10. Dr. Jikom Panor
    Veterinary Officer,
    Biological Park,
    Itanagar Wildlife Sanchuary Division,
    Naharlagur,
    Arunachal Pradesh-791110

11. Dr. K.D. Batwe
    Veterinary Officer,
    Sanjay Gandhi National Park,
    Borivali, Mumbai

12. Dr. Kallappa
    Veterinary Officer,
    Lion & Tiger Safari,
    Thyavarekoppa, Wildlife Division
    Shimoga.
    Karnataka-577201

13. Dr. M. Palit,
    Veterinary Officer,
    Tata Steel, Zoological Park
    Jubilee Park,
    Jamshedpur (Jharkhand)-831001

14. Dr. M.G. Maradia,
    Veterinary Officer,
    Rajkot Zoo,
    Rajkot, Gujrat.
15. Dr. Malay Maity  
Veterinary Officer,  
PNHZ Park, Darjeeling.  
West Bengal

16. Dr. M.S. Chaudhary  
Vet. Officer  
Jaipur Zoo, Ramnivas Bagh,  
Jaipur, Rajasthan

17. Dr. N. K. Jain  
Vet. Officer  
Maitriabag Zoo, Bilai Steel Plant  
Bhilai, Orissa

18. Dr. Rajeev Tripathi  
Veterinary Officer,  
Kanpur Zoological Park,  
Kanpur, U.P.

19. Dr. R.K. Sahoo  
Veterinary Officer,  
Indira Gandhi Park  
Zoo and Deer Park  
Town service Department  
Rourkela Steel Plant  
Sector -4. Rourkela  
Orissa-769002

20. Dr. R.K. Samantarai  
Veterinary Officer,  
Nandan Kanha Zoo,  
Bhunashuar.  
Orissa

21. Dr. Srinivas  
Veterinary Asst. Surgeon,  
Indira Gandhi Zoological Park,  
Visakhapatnam.530040

22. Dr. S.K. Mittal  
Veterinary Officer,  
Gandhi Zoological Park,  
Gwalior. M.P.

23. Dr. Sushil Sood  
Veterinary Officer,  
Himalayan Nature Park (Kufri)  
Himachal Pradesh Forest Department  
Wildlife Division, Shimla.  
Himachal Pradesh-171002

24. Dr. Shashi Kant Ajay  
Veterinary Officer,  
Sanjay Gandhi Biological Park  
Patna, (Bihar).

25. Dr. S.C. Valandikar  
Veterinary Officer,  
Sri Chamarajendra Zoological Garden,  
Indira Nagar  
Mysore.  
Karnataka

26. Dr. D.V. Shukla,  
Veterinary Officer,  
Sundervan Nature Discovery Centre  
Jodhpur Tekra, SM. Road  
Ahmedabad.-3380015  
Gujrat

27. Dr. M.S. Karavle,  
Asst. Supdt. (Vet.)  
Brihan Mumbai Mahanagar Palika,  
Veermata Jijabai Bhosle Udyan-Zoc,  
Dr. Ambedkar Road,  
Byculla Mumbai-400027.

28. Dr. L. K. Sanwal  
Vet. Officer,  
G.B.Pant High Altitude Zoo,  
Nainital, Uttanchal.

29. Shri Bipul Chakrabarty  
CZA(Ministry of Environment & Forest)  
Bikaner House, Annex-6  
Sahjahan Road,  
New Delhi.
30. Shri Brij Kishor Gupta, (Scientist)  
CZA(Ministry of Environment & Forest)  
Bikaner House, Annexe-6  
Sahjahan Road,  
New Delhi  

31. Dr. C.B.Patel,  
Vet. Officer,  
Sayaji Baug Zoo, Vadodara  

32. Dr. N.S. Manoharan,  
Zoo Director,  
V.O.C. Park Zoo,  
Coimbatore.  

33. Dr. Santosh Kr. Bhowmik,  
Ass. Director,  
Vet.of Sepahijala Zoo  
Tripura.  

34. Dr. Nirmaljit Singh  
Vet. Officer,  
M.C. Zoological Park,  
Chhatbir Punjab,  
Chandigarh.  

35. Shri Vanalalhraua Pachuau  
Wildlife Division,  
Aizawl, Mizoram.  

36. Dr. George Vergese  
Senior Vet. Officer  
Dept of environment & Forest, Port Blair ,  
Andamans  

37. Dr. B.K. Gogoi  
Pathologist,  
Assam State Zoo,  
Guwahati  

38. Dr. Pathan Nazrullah Khan  
Arignar Anna Zoological Park,  
Vandalur, Chennai,  
Tamilnadu  

39. Dr. Dr. Ranaware R.V.  
Maharashtra  

40. Dr. Utkarsh Shukla  
Zoo Vet. & Dy Director  
Lucknow Zoological Gardens,  
Lucknow, U.P.  

41. Dr. Ashok Kashyap  
Asstt. Vet.  
Lucknow Zoological Gardens,  
Lucknow, U.P.
# LIST OF BIRDS REPORTED FROM LUCKNOW ZOO

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>हिन्दी नाम</th>
<th>Scientific name</th>
<th>Systematic No.</th>
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<tbody>
<tr>
<td>1</td>
<td>LITTLE GREBE</td>
<td>छोटा जलकैल</td>
<td>Tachybaptus ruficollis</td>
<td>(5)</td>
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<tr>
<td>2</td>
<td>LITTLE CORMORANT</td>
<td>छोटा जलकैल</td>
<td>Phalacrocorax niger</td>
<td>(28)</td>
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<tr>
<td>3</td>
<td>DARTER</td>
<td>एनबुबी</td>
<td>Anhinga melanogaster</td>
<td>(29)</td>
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<tr>
<td>4</td>
<td>GREY HERON</td>
<td>सिलेडी अंजंग</td>
<td>Ardea cinerea</td>
<td>(36)</td>
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<tr>
<td>5</td>
<td>INDIAN POND HERON</td>
<td>बांध अंजंग</td>
<td>Ardea grayii</td>
<td>(42)</td>
</tr>
<tr>
<td>6</td>
<td>CATTLE EGRET</td>
<td>जलमग्नी बुगल</td>
<td>Bubulcus ibis</td>
<td>(44)</td>
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<tr>
<td>7</td>
<td>LITTLE EGRET</td>
<td>छोटा बुगल</td>
<td>Egretta garzetta</td>
<td>(49)</td>
</tr>
<tr>
<td>8</td>
<td>BLACK-CROWNED NIGHT HERON</td>
<td>खूब अंजंग</td>
<td>Nycticorax nycticorax</td>
<td>(52)</td>
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<tr>
<td>9</td>
<td>PAINTED STORK</td>
<td>चीन जलचितल</td>
<td>Mycteria leucocephala</td>
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<tr>
<td>10</td>
<td>BLACK KITE</td>
<td>बंदली पूर्वा</td>
<td>Milvus migrans govinda</td>
<td>(133)</td>
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<tr>
<td>11</td>
<td>SHIKRA</td>
<td>शिकरा</td>
<td>Accipiter trivirgatus</td>
<td>(144)</td>
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<tr>
<td>12</td>
<td>NORTHERN SPARROW HAWK</td>
<td>गांवा</td>
<td>Accipiter nisus</td>
<td>(148)</td>
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<tr>
<td>13</td>
<td>EGYPTIAN VULTURE</td>
<td>केलल गंडल</td>
<td>Nebon pernixpentherus</td>
<td>(186)</td>
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<tr>
<td>14</td>
<td>INDIAN PEAFOWL</td>
<td>पौत्र</td>
<td>Pavo cristatus</td>
<td>(311)</td>
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<tr>
<td>15</td>
<td>WHITE-BREASTED WATERHEN</td>
<td>टैक्का</td>
<td>Amaurornis phoenicurus</td>
<td>(343)</td>
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<tr>
<td>16</td>
<td>RED-WATTLED LAPWING</td>
<td>हिटरहरी</td>
<td>Canelus indicus</td>
<td>(366)</td>
</tr>
<tr>
<td>17</td>
<td>BLACK-WINGED STILT</td>
<td>हिटनेपुर</td>
<td>Himantopus himantopus</td>
<td>(430)</td>
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<tr>
<td>18</td>
<td>YELLOW-FOOTED GREEN PIGEON</td>
<td>भरियल</td>
<td>Treron phoenicoptera</td>
<td>(503)</td>
</tr>
<tr>
<td>19</td>
<td>ROCK PIGEON</td>
<td>चित्ता कुजुर</td>
<td>Columba livia</td>
<td>(520)</td>
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<tr>
<td>20</td>
<td>EURASIAN COLLARED DOVE</td>
<td>दार मल्ल</td>
<td>Streptopelia decaocto</td>
<td>(534)</td>
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<tr>
<td>21</td>
<td>SPOTTED DOVE</td>
<td>चित्तीदार गलता</td>
<td>Streptopelia chinensis</td>
<td>(537)</td>
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<tr>
<td>22</td>
<td>LAUGHING DOVE</td>
<td>हलली गलता</td>
<td>Streptopelia senegalensis</td>
<td>(541)</td>
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<tr>
<td>23</td>
<td>ALEXANDRINE PARAKEET</td>
<td>हेंड़न तोला</td>
<td>Psittacula eupatria</td>
<td>(546)</td>
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<td>24</td>
<td>ROSE-RINGED PARAKEET</td>
<td>सजबर तोला</td>
<td>Psittacula krameri</td>
<td>(549)</td>
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<tr>
<td>25</td>
<td>PLUM-HEADED PARAKEET</td>
<td>सुबनी तोला</td>
<td>Psittacula cyanocephala</td>
<td>(557)</td>
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<tr>
<td>26</td>
<td>PIED CUCKOO</td>
<td>चुकुगुड़</td>
<td>Clamator jacobinus</td>
<td>(570)</td>
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<tr>
<td>27</td>
<td>ASIAN KOEL</td>
<td>शैवदल</td>
<td>Eurynymys scolopacea</td>
<td>(590)</td>
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<tr>
<td>28</td>
<td>GREATER COUCAL</td>
<td>बड़ा नहोक</td>
<td>Centropus sinensis</td>
<td>(600)</td>
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<tr>
<td>Family STRIGIDAE</td>
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<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------</td>
<td>-----------------</td>
<td></td>
<td></td>
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<tr>
<td>29. JUNGLE OWLET</td>
<td>(<a href="ja">जंगली भोरिया</a></td>
<td>Glaucidium radiatum</td>
<td>(636)</td>
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</tr>
<tr>
<td>30. SPOTTED OWLET</td>
<td>(<a href="ja">बुंदीदार भोरिया</a></td>
<td>Athene brama</td>
<td>(650)</td>
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<tr>
<td>Family APODIDAE</td>
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<tr>
<td>31. HOUSE SWIFT</td>
<td>(<a href="ja">बिहोरि</a></td>
<td>Apus affinis</td>
<td>(703)</td>
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<tr>
<td>Family ALCEDINIDAE</td>
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<td></td>
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</tr>
<tr>
<td>32. PIED KINGFISHER</td>
<td>(<a href="ja">बिहोरि</a></td>
<td>Ceryle rudis</td>
<td>(719)</td>
<td></td>
</tr>
<tr>
<td>33. WHITE-THROATED KINGFISHER</td>
<td>(<a href="ja">बिहोरि</a></td>
<td>Halcyon smyrnensis</td>
<td>(736)</td>
<td></td>
</tr>
<tr>
<td>Family MEROPIDAE</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>34. GREEN BEE-EATER</td>
<td>(<a href="ja">रिवा पटजा</a></td>
<td>Merops orientalis</td>
<td>(750)</td>
<td></td>
</tr>
<tr>
<td>Family CORACIIDAE</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>35. INDIAN ROLLER</td>
<td>(<a href="ja">नीलकंठ</a></td>
<td>Coracias benghalensis</td>
<td>(755)</td>
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</tr>
<tr>
<td>Family UPUPIDAE</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>36. COMMON HOPPOE</td>
<td>(<a href="ja">हुप्पू</a></td>
<td>Upupa epops</td>
<td>(763)</td>
<td></td>
</tr>
<tr>
<td>Family BUCEROTIDAE</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>37. INDIAN GREY HORNBILL</td>
<td>(<a href="ja">केलंडनी दंडि</a></td>
<td>Tockus birostris</td>
<td>(767)</td>
<td></td>
</tr>
<tr>
<td>Family CAPTONIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. BROWN-BACKED STREAKER</td>
<td>(<a href="ja">बुंदीदार का बृंदंजा</a></td>
<td>Megalaima zeylanica</td>
<td>(780)</td>
<td></td>
</tr>
<tr>
<td>39. COPPERSMITH BARBET</td>
<td>(<a href="ja">नीलकंठ का कोटि</a></td>
<td>Megalaima haemacephala</td>
<td>(792)</td>
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<tr>
<td>Family PICIDAE</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>40. BLACK-RUMPED WOODPECKER</td>
<td>(<a href="ja">बुंदीदार का कुंटो</a></td>
<td>Dinopium benghalense</td>
<td>(819)</td>
<td></td>
</tr>
<tr>
<td>41. BROWN-CAPPED PIGMY WOODPECKER</td>
<td>(<a href="ja">रूपरंग का कुंटो</a></td>
<td>Dendrocopos nanus</td>
<td>(851)</td>
<td></td>
</tr>
<tr>
<td>Family ALAUDIDAE</td>
<td></td>
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<td></td>
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<tr>
<td>42. SMALL SKYLARK</td>
<td>(<a href="ja">सोटा अरंगिया</a></td>
<td>Alauda gulgula</td>
<td>(905)</td>
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<tr>
<td>Family LANIIDAE</td>
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<td></td>
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<tr>
<td>43. LONG-TAILED SHRIKE</td>
<td>(<a href="ja">लांटी सरायरा</a></td>
<td>Lanius schach</td>
<td>(947)</td>
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<tr>
<td>Family ORIOLIIDAE</td>
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<tr>
<td>44. EURASIAN ORIOLE</td>
<td>(<a href="ja">विनहरा तेलक</a></td>
<td>Oriolus oriolus</td>
<td>(952)</td>
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<tr>
<td>Family DICRURIDAE</td>
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<td></td>
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<tr>
<td>45. BLACK DRONGO</td>
<td>(<a href="ja">क्याला भूर्जं</a></td>
<td>Dicrurus adsimilis</td>
<td>(962)</td>
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<tr>
<td>Family STURNIDAE</td>
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<tr>
<td>46. CHESTNUT-TAILED STARLING</td>
<td>(<a href="ja">बुंदीदार ताल्लुक</a></td>
<td>Sturnus malabaricus</td>
<td>(987)</td>
<td></td>
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<tr>
<td>47. BRAHMINY STARLING</td>
<td>(<a href="ja">बहमी ताल्लुक</a></td>
<td>Sturnus pagodarum</td>
<td>(994)</td>
<td></td>
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<tr>
<td>48. ASIAN PIED STARLING</td>
<td>(<a href="ja">पाइड़ ताल्लुक</a></td>
<td>Sturnus contra</td>
<td>(1002)</td>
<td></td>
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<tr>
<td>49. INDIAN MYNA</td>
<td>(<a href="ja">देसी मैना</a></td>
<td>Acridotheres tristis</td>
<td>(1006)</td>
<td></td>
</tr>
<tr>
<td>50. BANK MYNA</td>
<td>(<a href="ja">रिंड मैना</a></td>
<td>Acridotheres ginningianus</td>
<td>(1008)</td>
<td></td>
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<tr>
<td>51. JUNGLE MYNA</td>
<td>(<a href="ja">वंगली मैना</a></td>
<td>Acridotheres fuscus</td>
<td>(1009)</td>
<td></td>
</tr>
<tr>
<td>Family CORVIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52. RUFOUS TREEPIE</td>
<td>(<a href="ja">साल कोंडीया</a></td>
<td>Dendrocitta vagabunda</td>
<td>(1030a)</td>
<td></td>
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<tr>
<td>53. HOUSE CROW</td>
<td>(<a href="ja">देसी कोंडा</a></td>
<td>Corvus splendens</td>
<td>(1049)</td>
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<tr>
<td>54. LARGE-BILLED CROW</td>
<td>(<a href="ja">बुंदीदार कोंडा</a></td>
<td>Corvus macrorhynchos</td>
<td>(1054)</td>
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<tr>
<td>Family PYCNONOTIDAE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>55. RED-WHISKERED BULBUL</td>
<td>(<a href="ja">बुंदाल बुल्बुल</a></td>
<td>Pycnonotus jocosus</td>
<td>(1123)</td>
<td></td>
</tr>
</tbody>
</table>
56. RED-VENTED BULBUL  
Family MUSCICAPIDAE, Sub family TIMALINAE
57. COMMON BABBLER
Sub family MUSCICAPINAE
58. ASIAN PARADISE FLYCATCHER
Sub family SYLVIINAE
59. ASHY PRINIA
60. TAILOR BIRD
Sub family TURDINAE
61. ORIENTAL MAGPIE ROBIN
62. BROWN ROCK CHAT
63. INDIAN ROBIN
Family MOTACILLIDAE
64. WHITE WAGTAIL
65. WHITE-BROWED WAGTAIL
Family NECTARINIIIDAE
66. PURPLE SUNBIRD
Family ZOSTEROPIDAE
67. ORIENTAL WHITE-EYE
Family PLOCEIDAE, Sub family PASSERINAE
68. HOUSE SPARROW
Sub family PLOCEINAE
69. BAYA WEAVER
Sub family ESTRILDINAE
70. RED AVADAVAT
71. GREEN AVADAVAT
72. SCALY-BREASTED MUNIA
73. BLACK-HEADED MUNIA

Systematic nos. used in this list are based on book - “Birds of Indian Subcontinent” by Dr. Selim Ali and S. Dillon Ripley.

Eva Sharma  
Director  
Lucknow Zoological Gardens  
Lucknow