Table 1. **Escherichia coli *serotypes isolated from wild animals and their sensitivity to antibacterial agents***

Source	Sample examined	Serotypes isolated	No. of strains sensitive to Ax	C	Cf	E	G	Ex	Tr	K
Gaur (*Bos gaurus*)	01	UT, O8, O9	-	2 (UT,O9)	3	-	1 (UT)	2 (UT,O9)	-	-
Asian elephant (*Elephas maximus*),	02	O32, O69	1(O32)	2	2	-	-	2	1 O69)	-
Fruit Bat (*Pteropus giganteus*),	01	O61, O108	1(O61)	2	2	1(O108)	1(O61)	2	1 O61)	1 (O61)
Porcupine (*Atherurus mecrourus assamensis*),	01	O56, O147	1(O56)	2	2	1(O147)	-	2	-	-
Palm Civet (*Paradoxurus hermaphroditus*)	01	O25	1	1	1	1	1	1	1	-
Krait (*Bungarus caeruleus*)	01	O1	1	1	1	-	-	1	-	-
Total	**07**	**11**	**05 45.4%**	**10 90.9%**	**11 100%**	**03 27.3%**	**03 27.3%**	**10 90.9%**	**03 27.3%**	**01 09.1%**

Ax - Amoxicillin; C - Chloramphenicol; Cf - Ciprofloxacin; E - Erythromycin; G - Gentamicin; Ex - Enrofloxacin; Tr - Tetracycline; K - Kanamycin

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Treatment of certain ailments in zoo animals

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Wild animals maintained in Zoo/Safari are affected with a number of infectious/non-infectious diseases. Diagnosis and management of these disease conditions pose a challenge to wildlife veterinarians. The present communication describes diagnosis and treatment/management of some disease conditions in zoo animals.

Photosensitization/dermatitis in Asian Elephant (*Elephas maximus*): A male Asian Elephant in musth was kept in a restrained position in an open shed for 3-4 months (December to April) and as a result it developed dermatitis and necrosis with sloughing of skin over back and left lateral side of abdomen. The animal was administered antihistamine (inj. Avil 30 ml, i/m) for five days and local dressing with himax lotion with coconut oil was carried out. It took about two months to recover. It is hypothecated that confinement of elephants and lack of soil and water bath can lead to such skin condition. The left lateral side of abdomen was more exposed to sunlight during captivity. Elephants have delicate epidermis, so it is recommended to bathe them daily and also provide protection from sunlight if they are in confinement. Phenothiazine (acepromazine) administration and prolonged exposure to sunlight during transport has been reported to cause photosensitization in elephants (Selvam *et al*., 1996).

Ketamine induced catalepsy in Himalayan Black Bear (*Selenarctos thibetanus*): An adult female Himalayan Black Bear weighing about 125kg was to be transferred from Chhat Bir zoo to another zoo in the country. Ketamine 6.0ml (600mg) was given, intramuscularly with a dart syringe. After 15-20 minutes, the animal started showing symptoms of maniacal excitement, head movements and paddling and became uncontrollable. As the animal was furious it was not possible to physically restrain it for intravenous administration of either diazepam or barbiturates, so alternatively xylazine (2.5ml, i/m), was administered. The animal calmed down and became unconscious within 15-20min. To reverse the anaesthetic effects of xylazine, yohimbine 60mg i/m was given. The animal recovered from anaesthesia and started showing symptoms of excitement again. It was bathed with fresh tap water at frequent intervals and complete recovery occurred within 4-5hr.

Perusal of literature revealed that use of ketamine (1000mg, i/m) alone for operating adult Bears (Pandey *et al*., 1994; Dutta *et al*., 1999) may produce mild tono-clonic spasms, lasting for 30-40 seconds, without any significant excitement. But in the present study an adult Himalayan Black Bear showed symptoms of maniacal excitement, head movements and paddling after administration of 600mg of ketamine. This difference in behaviour might be attributed to the difference in species of bear, or noisy environment, or individual susceptibility.

Ketamine is a poor muscle relaxant and causes catalepsy, hyperthermia and seizures in some species of animals. Ketamine alone or in combination with xylazine, has been indicated for chemical restraint of captive carnivores, non-human primates and reptiles (Arora, 2000). To control the side effects of ketamine, the premedication or concurrent use of xylazine (Amend *et al*., 1972; Yate, 1973), diazepam or acepromazine are advocated in dogs and cats. To control convulsions, barbiturates are advocated intravenously (Arora, 2000), which was not possible in the case of the excited bear. Ketamine and xylazine combination (1:1) has been reported successfully in bear (Dutta *et al*., 1999; Kumar *et al*., 2002). However, there is no cited literature on the use of xylazine to treat ketamine induced catalepsy. So xylazine may be indicated for the treatment of ketamine induced catalepsy in bear.

Dystocia in Nilgai (*Boselaphus tragocamelus*): A Nilgai was reported with dystocia for more than 12hr. The animal was administered with xylazine (200mg) and ketamine (200mg) mixture with pneumatic driven dart syringe to restrain the animal (Kumar, 2006) but it only produced sedation so additional 100mg each of xylazine and ketamine was repeated to anaesthetize the animal. During anaesthesia, 0.9% normal saline solution (4-5l) was given intravenously. Per vaginal examination revealed anterior presentation with head and neck extended over the foetus laterally and both the fore limbs of the foetus were present in the vaginal passage. Correction of the position of the neck was not possible. The foetus was delivered by traction. It was administered streptopenicillin 2.5g, analgin 250mg, and prednesolone 100mg intramuscularly; oxytetracyline (5.0g) bolus was given intrauterine. To reverse the anaesthetic effects yohimbine (30mg, i/v) was given. The animal recovered from anaesthesia and could stand and walk but it died a few hours later.

[W] See Images in the web supplement at www.zoosprint.org

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Postmortem examination revealed inflammed uterine horns with a small tear near the uterine bifurcation. A cyst of about 5-6cm in diameter was also observed in one lung, which was unrelated to the death of the animal. Death in such case might be related to multiple stress caused by physical exertion, excitement, anaesthesia and prolonged manipulation.

Maggot infestation in upper eyelid of Lion (*Panthera leo*): Maggot wounds are very common in domestic and wild animals, especially in summer and rainy season when the fly population is high. Maggot wounds are usually present in areas where animals cannot lick. Turpentine oil is used in these cases to remove the maggots from the wound. While treating maggot wounds on the face near eyes, the oil may accidentally seep into the eyes causing conjuctivitis. The present case describes the successful management of maggot wound in the upper eyelid of a lion.

One male adult hybrid lion was presented with maggot infestation in the upper eyelid, which due to swelling drooped to cover the eyeball. The lion was enclosed in a narrow caged house and turpentine oil was sprayed on the wound with syringe. After 5min the eye and wound was washed with tap water under pressure to remove the dead and live maggots. Iodoform mixed with glycerin was applied locally. Iodoform exerts fly repellent effect due to its odor. Ivermectin (@ 0.2mg/kg, 40mg total) was given intra-muscularly. Ivermectin is a broad-spectrum ecto- and endo parasitic drug with good efficacy against maggots (Sharma, 1994). Within 3-4 days of treatment, the wound was granulating and healed completely without any complications. Alternatively, the animal could be anaesthetized once for removal of maggots and medication, but repetitive tranquilization or anaesthesia is not desirable.

Pasteurellosis in Sambar (*Rusa unicolor*): An incidence of sudden death in an adult Sambar maintained in a Deer Safari is reported here. Postmortem examination revealed haemorrhagic spots on visceral organs including trachea, lungs, heart, rumen and spleen (Image 1[w] & 2[w]). Impression smears made from cut surfaces of organs stained with Giemsa revealed gram-negative bipolar rods suggesting *Pasteurella* spp. infection. Cultural examination was not done to confirm the diagnosis. Preventive measures adopted to save the rest of the deer included cleaning of water premises, change of water, preventing entry of public in the deer safari and administration of broad-spectrum antibiotic (enrofloxacin 10%) in about double dose (@ 10mg/kg) mixed in feed for five days. No death was reported later. Pasteurellosis in deer has earlier been reported by Srinivasan *et al.* (1977) and Damodaran *et al.* (1977) with similar lesions in visceral organs on postmortem examination.

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Electric burn injury in the oral cavity in a Nilgiri Langur *Trachypithecus johnii* - a case report

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Wild animals are exposed to various physical injuries like burns due to fire, electrocution etc. Electrocution to wild animals occur from accidental contact with either illegal electric wire fencing, or from overhead live wires. Electric burns of the oral cavity can involve lip, tongue, mucous membrane and underlying bone (Nichter *et al*., 1985). Small animals typically receive low voltage injuries from chewing electrical cords. Alternating current causes sustained tetanic contractions of striated muscles which can make it impossible for a victim to release from the source until the circuit is broken (Remensnyder, 1990). An acute case of electric burn injury of the oral cavity, tongue and face in a Nilgiri langur and its successful treatment is discussed.

A 15yr old male Nilgiri Langur weighing 10.5kg was brought to the teaching Veterinary College Hospital, Pookot, Wayanad by the forest officials who found the animal lying near a transformer with injuries apparently resulting from electrocution. The animal was dehydrated; its mouth open and continuous drooling of saliva. The eyes were tightly closed and the periorbital region and face were edematous. There was complete charring of skin in the face and singing of hair in the fore head and other hairy areas (Image 1[w]). The respiration, pulse rate and body temperature were 24/min, 134/min and 39.2^{0}C, respectively and all the visible mucous membranes were congested. General anaesthesia was effected with 150mg of ketamine hydrochloride (Neon Lab), intramuscularly after premedicating with diazepam 2ml (Ranbaxy), intramuscularly. Examination of the oral cavity revealed that both dorsal and ventral aspects of tongue were lacerated and there was peeling of mucosa. The lacerations were cleaned with potassium permanganate lotion (0.1%) and painted with Dentogel® (Indoco remedies). The facial region was cleaned with potassium permanganate lotion and was painted with povidone iodine. The eyes were cleaned with 2% boric lotion and gentamicin eye drops were applied. Ringer lactate (250ml, Sanctus Pharma) was given intravenously. Inj. amoxicillin (250mg, Intas Pharma), inj. meloxicam (2ml, Intas Pharma) and inj Beplex Forte (2ml, Anglo-French drugs) were given intramuscularly.

The same treatment was repeated on the second day after anaesthetizing the animal with 150mg ketamine hydrochloride. Ringer lactate (100ml) was also given intravenously. Inj amoxicillin was repeated at 12hr intervals. The animal started showing improvement. The same treatment was continued for the next six days.

On third day the animal opened its eye with difficulty. By the fourth day, the tongue lacerations showed marked signs of healing and the animal started accepting fruits. The treatment was continued for three more days and the animal made an uneventful recovery (Image 2[w]) and was released back to wild by the forest officials after observing the animal

[w] See Images in the web supplement at www.zoosprint.org

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