

Antecedents of Locomotor Disorders in Wild animals and its Impact - An Insight

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Abstract

Locomotion is the most essential activity for survival of living creatures in the world. Locomotion assist these animals in performing natural feeding, territorial behaviors, social interactions, breeding behaviors and protect themselves against any danger etc. Locomotor disorders due to natural or unnatural reasons adversely affect the survivability of wild animals. This is a detailed report of locomotor disorders and its antecedents viz. road accidents, predator attacks, electrocution, animal conflicts, old age and kite flying. The data's have been collected during various ecological and behavioral studies in different parts of Rajasthan, India.

Keywords: Antecedents; locomotor disorders, wild animals

Introduction

Locomotion is the most essential activity for survival of living creatures, assisting animal movement in their home range and performing various behaviors and activities essential for survival. With the help of locomotion, animals can perform natural feeding, territorial behaviors, social interactions, breeding behaviors and protect themselves against any danger etc. Many times due to natural or unnatural reasons, the animal cannot perform locomotion and in its absence animals cannot survive (except primates). Locomotor disorders are observed in different species of wild animals caused due to several natural and unnatural reasons. There are some isolated reports available on locomotor disorders in the zoo's, but no detailed and systematic account in wild's animal and its causes are recorded till date. The present communication documents different types of locomotor disorders its natural or unnatural causes, impact on the animal survival and animal behavior. The study was conducted in the last 15 years in different parts of Rajasthan in animals suffering with locomotor disorders due to road accidents, predator attacks, kite flying, electrocution, man-animal conflicts as major causes and injured by spine or quills, old age, natural by birth, accidental fall from height, inter and intra species interactions

as main causes in mammalian species (viz. Leopard, Hyaena, Caracal, Indian wolf, Jackal, Hanuman langurs, Jungle cat, Chinkara, Blue bull and Sloth bear), avian species (viz. Blue rock pigeon, House sparrow, Common crow, Common babbler, Maina, Parrot, Peacock, Long-billed vulture, White-rumped vulture, Cinereous vulture, Egyptian vulture, Eurasian griffon, Himalayan griffon and Kite) and in Ranthambore National Park, a crocodile with amputated limb, probably caused by predatory attack by the tiger.

Material and Methods

Study Area

The Thar desert covers an area of about 0.32 million sq.km which is nearly 12% of the total geographical area of India. It spreads over the four states of Rajasthan (62%), Gujarat (20%), Haryana and Punjab (9%) and in the west merges with the fertile plains of the Indus in Pakistan. The Thar desert of Rajasthan comprises 13 districts stretching from Ganganagar district in north to Sirohi in south and Jaisalmer in its west (Fig.1). The Thar desert forms ideal habitat for the many threatened faunal species like Leopard (*Panthera pardus*), Hyaena (*Hyaena hyaena*), Caracal (*Caracal caracal*), Jungle cat (*Felis chaus*), Desert cat (*Felis sylvestris*), Indian wolf (*Canis lupus*), Jackal (*Canis aureas*), Desert fox (*Vulpes vulpes pusilla*), Fox (*Vulpes bengalensis*), Toddy cat (*Paradoxorus hermaphordiatu*s), Hanuman langur (*Semnopithecus entellus*), Blackbuck

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(*Antilope cervicapra*), Chinkara (*Gazella gazellai bennettii*), Blue bull (*Boselaphus tragocamelus*), Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*), Porcupine (*Hystrix indica*) and many other birds and reptiles. A total of 45 mammalian species were observed in the study area, out of which 11 species are threatened and listed in the Schedule-I of Indian Wildlife Act, 1972. Over 200 bird species were observed in the study area, of which 6 species are listed in the Schedule-I of Indian Wildlife Act, 1972.



Fig. 1: The Thar desert area in Rajasthan

Methods

Data collection included

During long-term eco-behavioral and population dynamics studies of Hanuman langur (*Semnopithecus entellus*) carried out between 1995-2001 using focal, scan and ad-libitum sampling of Altmann (1974); in the various sites of study area (Chhangani, 2000; 2002a,b; 2003a,b; 2004a,b, c, d; 2005; 2007a,b; 2009a,b; 2010; Chhangani and Mohnot 1997; 2004; Rajpurohit *et al.*, 2006 and Wait *et al.*, 2007; Jonathan *et al.*, 2011). Since 1995 to 2011, continuous field studies has been conducted on the ecological and population dynamics of resident and migratory vultures by monitoring their nesting sites, collecting data on aspects of demography predation, interspecies interaction, seasonal migration and behavior in different parts of Rajasthan. Photography and videography supplemented these observations to confirm the presence of difficult-to-identify vertebrate species, especially birds. Systematic data on road accidents, predatory attacks, man-animal conflicts, electrocution and others were collected during various field studies.

Injured animal found during the study period were rescued with the help of community, NGO's, Zoo's and Veterinary department. The animals were rescued in safe cages made of the local material and transported to Jodhpur and Bikaner Zoo's or captive facilities operated by state forest department and Veterinary department.

Results and Discussion

Road Accidents

During December'2009 to May'2011, a total of 150 road accidents were recorded in and around Jodhpur. Of these, 49% were birds, 39.5% were mammals and 11.5% were reptiles. Among these, 80% occurred on highways most commonly along sharp turns, slopes, near water holes, road side animal feeding grounds (Fig. 2 and 3). Altogether 25 species of animals were found killed and injured in road accidents. During road accidents animal hit by the vehicles were mostly killed, but some time they survive with injuries, fractured and facing serious locomotor disorders in absence of timely rescue and veterinary assistance. Injured animal who received people's attention and were rescued to nearby veterinary facilities or zoos and survived. The animals without any assistance die in due course of time or killed any predators. The animals suffering with minor injuries and fractures sometimes survive with dysfunctional limbs (Fig. 4-7). The details of animal species observed in road accidents and their survives are given in Table 1,2 and 3. Roads therefore pose a serious threat to wild animals living in and out of protected areas. If strict measures are not taken for managing highway traffic and roads, the number of deaths of wild animals will continue to increase in and around the protected areas. Road killing is a serious threat to many threatened animals and birds (Chhangani, 2004 a,b,c,d).

Electrocution

In time of increasing urbanisation, the wild animals live in and around the urban habitats, facing variety of threats including mainly road accidents and electrocution, specially the extension of electricity supplying through open wires and electric poles. At times these electric poles and wires are used by many animals and birds for nesting and roosting. But they are also a serious threat to many birds and arboreal mammal species like

Hanuman langur, variety of bats, flying foxes, vultures, kites, crows etc (Fig.8-15). Due to electric shock the birds and mammals usually died but many times injured and fall on the ground with the dysfunctional body parts or wings. The details of the animals and birds injured or lost body parts due to electrocution are listed in Table 2 and 3.

absence of rescue or veterinary aid die. Some 8-10 of injured vultures of different species were reported due to kite flying accidents in the study area. This needs further investigation as we assume more deaths, which go unreported. During the breeding season, the breeding pairs have to make several rounds between the nest



Fig. 2 : Black buck crossing the road



Fig. 3: Chinkara killed in road accident



Fig. 4: Hanuman langur injured on right leg



Fig. 5: Hanuman langur with right hand loss

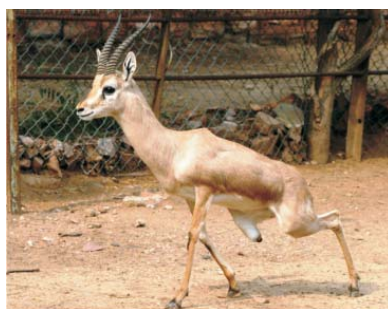


Fig. 6: Chinkara with lost left hind limb



Fig. 7: Blue bull with lost right hind limb

Kite flying

In many parts of Rajasthan on the occasion of kite festival on 'Makar Sankranti' or 'Utrayan' (in January) and 'Akha Teej' (in March or April), thousands of people fly kites with glass coated threads, often injure hundreds of birds including vultures. This is also the breeding season of many birds including vultures like White-rumped vulture, Long-billed vulture and Egyptian vulture population breeds in many parts of the study area particularly in and around cities of Ahmedabad, Surat, Jodhpur, Bikaner, Pali, Sirohi, Jalore and Nagaur etc. These cities witness massive kite flying. We observed several vultures dying due to injuries sustained on their wings and hands due to the glass coated threads, harming body parts severely. As a result the birds cannot fly, in

and the foraging area to build nests and feed chicks. We found that during landing, their speed is as high as over 60 km/hr. At this speed the sharp kite thread cut their wings or a body part. Similarly birds like owls, kites, blue rock pigeons, house sparrow, etc. were also seriously injured due to kite flying (Fig. 16-22). The similar situation is also reported from Gujarat where in the kite flying on 'Utrayan' thousands of birds injured and killed due to kite flying including vultures (Chhangani 2007a; Barvah, 2010 and Shastri, 2011).

Predation

Increasing numbers of feral dogs (*Canis familiaris*) also effect the population of wild animals, especially mammals and birds. In the last few years, dogs have emerged as predators of wild

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Fig. 8: Hanuman langur on electric pole



Fig. 9: Hanuman langur infants playing on electric pole



Fig. 10: Electrocutted Hanuman langur with paralytic right hand



Fig. 11: Dead Eurasian Griffon vulture due to electrocution



Fig. 12: Electrocutted Pariah kite on the electric pole



Fig. 13: Injured Cinerous vulture due to electrocution



Fig. 14: Electrocutted Peregrine falcon



Fig. 15: Electrocutted Eurasian Eagle owl

encounters and interactions, 34 Hanuman langurs were observed killed by different predators from 16 troops including 3 focal troops. Of which 27 langurs of different age and sex were survived with lost limbs are summarized in Table 3.

Hanuman langurs have many predators in the study area. Feral dog (*Canis familiaris*) appears to be the major predator in most of the habitats of study area. Whereas panther, jackal, wolf, hyeana, etc. are predators in and around protected areas. Langur predation by dogs have been reported in several studies. Predation by panther in the forest area was also reported in several studies like Kanha by Schaller (1967); at Mt. Abu by Hrdy (1977); at Varanasi by Pirta (1982); at Kumbhalgarh by Chhangani and Mohnot (1997); Chhangani (2000) and at Mount Abu by Jugtawat (1999). In many cases the langur survives after the attack by predators with some minor or major injuries with lost hands, legs and tails.

Man and Wildlife Conflict

Crop raids by wild mammals, like Blue bull (*Boselaphus tragocamelus*), Sloth bear (*Melursus ursinus*), Wild boar (*Sus scrofa*) Hanuman langur (*Semnopithecus entellus*) and Porcupine (*Hystrix*

animals and birds (Fig. 23 and 24) including Hanuman langur (*Semnopithecus entellus*), Bluebull (*Boselaphus tragocamelus*), Chinkara (*Gazella bennellii*), Black buck (*Antilope cervicapri*) in and around Jodhpur and in many protected areas in Rajasthan (Chhangani, 2003a). Dogs also compete with threatened hyena (*Hyaena hyaena*), Indian wolf (*Canis lupus*) and jackal (*Canis aureas*). Man's best friend has become wildlife's worst enemy in this way (Daniel, 2004). Precise counts of dogs in villages surrounding the reserve are unavailable. A more precise census coupled with reproductive control of feral dogs, will be essential for successful conservation. Out of 260 observed attacks,

indica) have been widely reported in all the villages of the study area. Such raids do pose considerable damage to crops, vegetable fields and orchards, sometimes ruining an entire harvest in a single nightly event. Prospects for electrical fencing or other expensive and resource intensive solutions are poor. Farmers use a range of informal methods to protect their crop fields and orchards from wildlife. However, the most commonly used crop protection strategy is direct night guarding of fields during the crop season. This method is used by 60% of the farmers in the

study area. 20% of field owners use 'gophan', a device to throw stones towards animals to chase them away from the field. Few farmers (about 15%) use dogs for crop protection and to chase the wild animals. Many times these dogs kill wild animals, in particular juveniles and infants. While the remaining 5% of farmers use dangerous methods like shotguns, potash bombs and high voltage electric current around farm fields. In all the different crop protection methods many times wild animals were killed or seriously injured with lost limbs and other organs (Fig. 5).



Fig. 16-17: Kites and Barn owl injured due to kite flying



Fig. 18-19: Loss of leg and wing in Egyptian vultures due to kite flying injuries



Fig. 20: Loss of wing in White rumped vulture due to kite flying injuries



Fig. 21: Loss of leg in House sparrow due to kite flying injuries



Fig. 22: Kite flying injuries in a Fruit bat



Fig. 23: Hanuman langur attacked by dog



Fig. 24: Predation on vultures by feral dogs

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Fig. 25: Hyaena with locomotor disorder due to *Acacia nilotica* spine



Fig. 26: Hyaena feet with *Acacia nilotica* spine causing locomotor disorders



Fig. 27: Old age associated locomotor disorder in Hanuman langur



Fig. 28: Loss of eye due to intra species fight in Chinkara



Fig. 29: Intra species aggressive interaction in the Gyps vultures



Fig. 30: Locomotor disorder due to over grown claws in a Sloth bear

Table 1: Wild animals with locomotor disorders - its cause and impact

Animal	Cause of locomotor disorder	Number of animals and body part lost
Chinkara (<i>Gazella gazelle</i>)	Predation/ Road accident	3 (Right front and left hind leg and Eye)
Black buck (<i>Antelope cervicapra</i>)	Road accident	1 (Right front leg)
Blue bull (<i>Boselaphus tragocamelus</i>)	Road accident	1 (Left hind leg)
Jackal (<i>Canis aureas</i>)	Road accident	2 (Right front leg)
Hyaena (<i>Hyaena hyeana</i>)	<i>Acacia nilotica</i> spine	1 (Left hind leg)
Sloth bear (<i>Melursus ursinus</i>)	Nail overgrowth	1 (Left front claws nail)
Jungle cat (<i>Felis chaus</i>)	<i>Prosopis juliflora</i> spine	1 (Right front claws)
Desert cat (<i>Felis sylvestrus</i>)	<i>Acacia senagle</i> spine	1 (Left front claws)
Fruit bat (<i>Pteropus giganteus</i>)	Kite Flying / Electrocuted	2 (Wings)
Greater mouse-tailed bat (<i>Rhinopoma microphyllum kinneari</i>)	Kite Flying/ Predatory attack by kite	2 (Wings)

Others

There are several locomotor disorders observed in study area which are caused by very unusual causes, other than above. Like, one Hyaena (*Hyaena hyaena*) was observed wounded and injured by the Babul (*Acacia nilotica*) spine near Rajpura, Sadri (Fig. 25 and 26). Similar injuries and cause of locomotor disorder was observed in Jungle cat (*Felis chaus*), Desert cat (*Felis sylvestris*) and Jackal (*Canis aureas*) injured by the spines of Babul (*Acacia nilotica*), Angrajee babul (*Prosopis juliflora*). In such situation injured animals neither walk nor hunt for food and in absence of rescue they die in nature. In a similar case a Leopard (*Panthera pardus*) was found injured and unable to walk properly because of the Porcupine (*Hystrix indica*), quills in the right front feet. With the help of tranquilizing the animal was treated and released normally in the wild

area. It is important to know that such locomotor disorders are due to very small causes but animal die either due to hunger or are killed by predators or in absence of veterinary aid. Locomotor disorder in old Hanuman langurs were observed in and around Jodhpur due to the old age (Fig. 27), here Hanuman langurs reported to live up to the age of 35 years (Mohnot, 1999). Such old female usually cannot move with the troop in the home range areas to feed and are completely depending on the artificial feeding by people. They avoid close proximity to the young troop members and live in isolation. Many times during inter and intra specific aggressive interactions some loss their limbs, eye or wings. Further this cause serious locomotor disorder (Fig. 28 and 29). Skin disease also causes very fetal locomotor disorder in which animal skin loss the flexibility and animal couldn't move much to forage and slowly in absence of treatment and rescue died.

Table 2: Wild birds with locomotor disorders - its cause and impact

Animal	Cause of locomotor disorder	Number of animals and body part lost
Long-billed vulture (<i>Gyps indicus</i>)	Kite flying	2 (Wings)
White-rumped vulture (<i>Gyps bengalensis</i>)	Kite flying	6 (Wings)
Cinereous vulture (<i>Aegypius monachus</i>)	Electrocution	1 (Wings and legs)
Egyptian vulture (<i>Neophron percnopterus</i>)	Kite flying	5 (Wings and legs)
Eurasian griffon (<i>Gyps fulvus</i>)	Electrocution	2 (Wings)
Himalayan griffon (<i>Gyps himalayansis</i>)	Predation	1 (Wings and legs)
Barn owl (<i>Tyto alba</i>)	Electrocution	2 (Wings and legs)
Eurasian eagle owl (<i>Bubo bubo</i>)	Electrocution	1 (Wings)
Indian peafowl (<i>Pavo cristatus</i>)	Electrocution	5 (Wings and legs)
Indian house sparrow (<i>Passer domesticus indicus</i>)	Predation	2 (Legs)
Peregrine falcon (<i>Falco Peregrinus babylonicus</i>)	Electrocution	1 (Wings)
Pariah kite (<i>Milvus migrans govinda</i>)	Electrocution	3 (Wings and legs)
Pied myna (<i>Sturnus contra</i>)	Predation	2 (Legs)
Blue rock pigeon (<i>Columba livia</i>)	Electrocution	4 (Legs)
Common babbler (<i>Turdoides caudatus</i>)	Predation	1 (Legs)
House crow (<i>Corvus splendens</i>)	Electrocution	2 (Legs)

Table 3 : Hanuman langurs with locomotor disorders - its cause and impact in and around Jodhpur (December' 2009 to May' 2011)

Group No.	Location	Cause of locomotor disorder	Number of animals and managerial amputation
B1	Daijar temple	Predation and Inter-species interactions	2 (Right hand, Tail)
B3	Beriganga	Predation	1 (Tail)
B4	Nimba	Predation	1(Right hand)
B5	Nimbri	Predation	2 (Tail and Left hand)
B6	Mandor Devel	Predation and Inter-species interactions	3 (Right hand, Tail, Left leg)
B8	Mandor temple	Inter-species interactions	1 (Right hand)
B9	Mandor nursery	Road accident	1 (Left hand)
B11	Kaga North	Electrocution	1 (Right hand)
B12	Kaga South	Road accident	1 (Tail)
B13	City Pachatia hill	Electrocution	2 (Right hand, Tail)
B14	City Ranisar	Electrocution	2 (Tail and Left hand)
B15	Chandpole choka	Road accident/ Electrocution	2 (Right hand)
B17	Guptganga	Road Accident and Inter-species interactions	3 (Tail, Left hand, Left leg)
B17a	Soorsagar bgachi	Electrocution	1 (Left hand)
B22	Bhembharak	Predation/ Road Accident	2 (Right hand and Tail)
B23	Sidhnath East	Predation	1(Tail)
B26	Kadamkandi East	Predation/ Road Accident	3 (Right hand)
B26a	Kadamkandi Southeast	Road Accident	2 (Right hand)
B27	Kadamkandi West	Road Accident	1 (Tail)
B28	Bhadreshwar	Predation	1 (Left hand)
B29	Arna-Jharna	Predation	1 (Tail)

Even an unusual growth of the nails of the claws of sloth bear and cause locomotor disorder (Fig. 30), which restricts the movement for feeding and day to day activities of the animal.

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