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Livestock predation by Tiger (Panthera tigris) in Corbett Landscape, Conflict and conservation Implication

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Abstract

Tiger, the largest of the felids are now a globally threatened species. Tiger readily kill domestics' animal. Attraction towards livestock predation leads conflict. 92 scats samples of Panthera tigris were analyzed. Place of collection of scats indicates the movement pattern of tiger and tiger's food and feeding behaviour. Scat analysis is the method by which we can reconstruct the diet of tiger because direct killing of prey by tiger is very tough to find even we cannot track at all. Undigested remains in the form of hair depict the prey species and choice of food. By this finding of livestock remains in the form of hair provide the dynamics of conflict with scientific evidence. By this conflict we can correlate the conservation strategies and its implications at all. Some scat sample collected from Corbett periphery and it indicated the movement pattern and scientific evidence of livestock predation i.e. findings of undigested hairs remain of cattle etc.

Keywords: Livestock predation, conflict, scat analysis, tiger conservation.

Introduction

Corbett Tiger Reserve is a land of roar. On the ground of human-tiger conflict and livestock predation had revealed the remains of cow, buffalo were resulted at all. At least 4-5 kg of food is necessary as per day diet. For survival in wild the tiger have to face a series of challenges like attempt to kill its prey. Many die heart situation over there. On the other in search of easy prey tiger can change their movement pattern. For easy prey large felids attract toward human settlement along with livestock (cow, goat and buffalo etc). There are a lot of ecological cum sociological reasons for the chances of conflicts. Whenever the tiger habitat will disturb or come in stress, the wildlife has to move from core to buffer or periphery for survival. Sometimes tiger show habit to prey upon specific choice of food leads conflict and develop the negative attitude of people towards tiger conservation i.e. livestock predation or domestic kill etc. Some time it happens the human beings are also victimized if so than tiger will defame with the name of man-eater. Tiger will never be a man-eater, several hypothesis have been proposed to explain prey selection by predators. These hypotheses pertain to ultimate causative factors such as energetic benefits and cost involved[1] as well as to proximate mechanism of selection such as search images or prey vulnerability[2]. Size of faecal matter among carnivores is varies less[3]. By scat analysis and consumption of food can correlate the tiger movement in human settlement. If vital fulfilling is disturbed in core area, the tiger will move outside and livestock predation will occur. Predator-human conflict is an important conservation issue that has global prevalence[4-7]. It is expected that if density of livestock is more than wild prey in forest edges and if the predators are free ranging, then cattle are prone to attacks[8]. Factors such as free ranging of livestock, presence or absence of the grazers with them and time of livestock entry and exit to and from the forest also have been considered as reasons for conflict[9]. The conflict could also result in loss of habitat or prey biomass and an increase in the population of predators in a landscape with no or very less prey biomass . It is also argued that when large cats live in proximity to human habitations, the conflict at the border area is inevitable.

Material and Methods

Main material is tiger scats for analysis and diet reconstruction.

Study Area: The Corbett Tiger Reserve is confined to the Bhabar tract of Siwalik formation at altitude of 400-1200m. Vital statistics of CTR is Area 1318.54 sq.km (core; 520.82 sq.km. Sonanadi Wildlife Sanctuary: 301.18sq.km). Reserve Forest 496.54sq. km. Longitude 78° 5 ' E to 79°5'E., Latitude 29°25'N to 29°40'N. Altitude 400ml-1, 2010m above mean sea level. There are three distinct seasons: Winter (Nov-Feb), summer (March-mid June) and Monsoon (mid June-October)[10]. The temperature ranges from 3°C minimum in January to 46°C in June. Vegetation in the major areas of the park consists of mixed deciduous tropical and sub tropical forests with Sal (Shorea robusta) as the dominant species. The Ram Ganga enters the Reserve from the northeast and after several zigzag turns emerges out from the south-west. The Palain, Sonanadi, Mandal and the Rāmgangā rivers are the major perennial water bodies of the reserve that contain water all year round. Apart from those there are numerous other seasonal water courses that remain dry from March to onset of the rainy seasons. River KOSI an important river of the foothills of Kumaon runs parallel to eastern boundary of the Reserve .A number of human settlements have come up along this river; amongst these are

Garjia and Ramnagar. Corbett is surrounded by 5 Forest Division i.e. Ramnagar Forest Division, Lansdowne Forest Division, Garhwal Forest Division, Tarai West Forest Division and Bijnor Forest Division.

Study Materials: Tiger scats from Corbett landscape with the staff and during field work. The periods of collection scat extends September 2012 to December 2014[11]. Total 93 scats were analyzed for the study of undigested remains. By preparing the hair impression slide identification of prey species were identified and reconstructed the tiger diet[12].

Methodology

Tiger scats are found to be less coiled and having larger distance between two successive constrictions within a single piece of scat, when compared to leopard which were mostly coiled and have similar distance between constrictions . In nature it is very difficult to see the tiger to kill its prey even we cannot track to out skirt the killing of prey. Some time by luck it happened. By indirect method through the collection of scats containing hair as undigested remains which will reveal the animal preyed upon by the tiger.

Procedure: As described by Koppikar and Sabnis[13]. The method was slightly modified in the present investigation.Very first all hair specimens were properly washed in Luke worm water, and then passed through ether or xylol. The fresh slides were smeared with colourless nail polish/ ethyl lactate (having refractive index close to glass slides) then sorted hairs (1or 2) were passed and kept straight on the smeared slide with the help of forceps. Just after 7-10 minutes the hair was pealed out from the smeared slide and impression of hair observed on the smear slides under compound microscope. Gross appearance, hair length, diameter, and colouration were noted and actual photographs were taken in three different regions of the hair impression on high power (400X) of the microscope, which were used as a key for the identification of a carnivore's diet and feeding habits.

Cuticular impression of the hairs of prey species of the tiger (Panthera tigris):

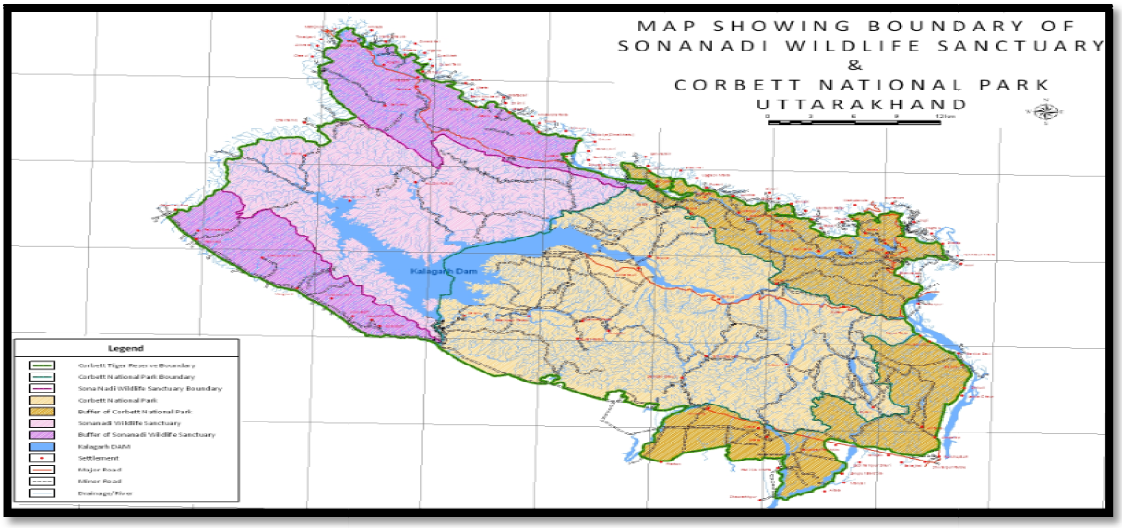

Figure-1
Map showing study area

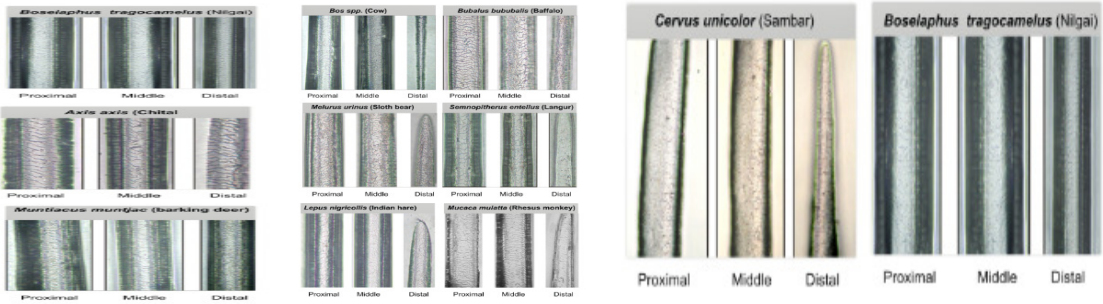

Figure-2
Cuticular pattern of hairs found in scat samples indicates the prey species

Calculation of biomass: The biomass consumed per animal/ day was calculated[13] by using the formula:

$$C = \frac{T}{N.n}$$

Where: C= Biomass consumption, T= Total biomass in kg (determined from hair remains in each scat), Observation of one type of hair indicates one animal consumed/ killed. Two different types of hairs indicate two different types of animal consumed/ killed. The ideal weights of these animals are considered for biomass calculations). N= Number of scats collected, n= Number of animals consumed/ killed.

Results and Discussion

92 scats of Tiger from Corbett Tiger Reserve and its periphery were analyzed for any undigested remains The results of scat analysis of tiger are summarized in table-1,2. The analysis of these tiger scat revealed remains of 8 prey species with high preponderance of langur (*Semnopithecus entellus),* Samber (*Cervus unicolor)*, Goat, Cheetal (*Axis axis)*. The prey preference on the basis of biomass was cow > Samber > chital >wild boar > porcupine. No scat was found with 2 or more prey species. Daily consumption each tiger was found to be 1.00 kg/day /and annual consumption was 365 kg.

Daily consumption (c)

$$C = \frac{T}{N \times n} \qquad \frac{8139}{7396} \qquad = 1.100 \text{ Kg. / day / Tiger}$$

Annual Consumption: 1.100 x 365 = 365 Kg.

Result show daily consumption but this result indicates critical condition regarding food and feeding of tiger. At least 3 to 4 kg food is required to a tiger for better survival[14]. So if we calculate daily consumption of total tiger population and then annual consumption of total tiger present in this study area the result will be surely critical. So result also indicates livestock predation more in this area and it directly indicates the chances of conflict.

Table-1
Percentage occurrence of undigested remains recorded in the tiger scat from Corbett and its periphery

Sr. No	Prey species	No. of animals	% occurrence	Animal weight Considered (kg)	Biomass (kg)	% Biomass
1	Semnopithecus-entellus(langur)	27	29%	21	567	6%
2	Axis axis (Cheetal)	15	16%	85	1275	14%
3	Cervus unicolor (Samber)	10	11%	225	2250	25%
4	Sus scrofa (Wild boar)	8	9%	100	800	9%
5	Cattle cow	12	13%	300	3600	40%
6	Goat	5	5%	45	225	3%
7	Macaca mulata	6	7%	11	66	1%
8	Hystrix indica (Porcupine)	9	10%	18	162	2%
	Total	**92**			**8945**	

Considered weight of animal in kg according to Vivek Menon: A field guide to Indian mammals and Prater- Book of Indian mammals

Table-2
Daily consumption by Tiger (Panthera tigris) in Corbett landscape

Formula	Total biomass of Faecal contents in Kg (T)	Year and number of scats	No. of animals	Daily consumption in Kg.
$C = \frac{T}{N \times n}$	8945	2012-2013 92	92	1.00 kg/day

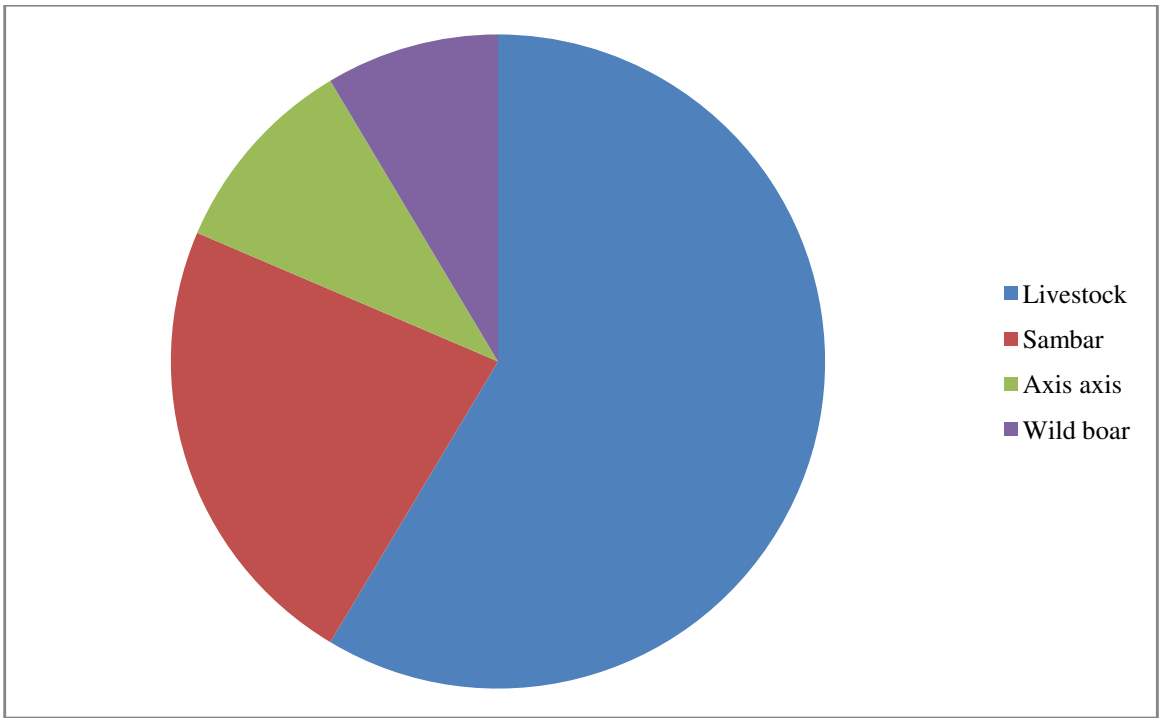

Figure-3
Percentage of biomass consumption of prey

Pie chart indicates the livestock predation (40% domestic kill) and this result depicts the conflict and may develop the negative attitude of people toward tiger conservation.

Discussion: Present study depicts the very important issues of wildlife conflict and tiger conservation. Livestock predation leads the conflict and ultimately it introduces the negative attitude towards tiger. Tiger preyed on domestic animal like cow, goat etc. This type of specific choice of food brings the chances of face to face situation of man and tiger and other wilderness. This study also depicts the movement pattern in human dominated area by tiger which not good for human beings and tiger ecologically at all[15].

At least if we analyze the percentage of biomass consumption by tiger this study indicates that 40 % are domestic kill in diet. Such a critical habit and choice of food compel to big cat to move in buffer and other human dominated area[16-17]. Ringora, Kiyari, Sunderkhal, Mohan, Goujra and in Tarai West Forest region linked to Corbett Tiger Reserve where human settlement with Gujjar Deras are prone to livestock predation.

Conclusion

The present work shows the depletion in prey species i.e. pie chart shows 40% livestock predation which indicates the conflict and daily consumption is 1.100 kg/ day / Tiger, it also leads towards the scarcity of food availability. These are the important factor which compel to tiger from core to buffer.

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