An Insight Into the Diet and Prey Preference of Tigers in Bardia National Park, Nepal

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Short Communication

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Abstract

We studied the diet and prey preferences of tigers (*Panthera tigris tigris* Linnaeus, 1758) in Bardia National Park, Nepal using DNA-based techniques from their scat samples. Remains of prey species in scats were identified through microscopic hair morphology analysis. Of 101 scats, DNA was extracted from 84 samples and 75 were assigned to tigers (34 males and 41 females). We found seven and six prey species in the diet of male tiger and female tiger, respectively. The diet of male and female tigers did not differ significantly, with chital (*Axis axis* Erxleben, 1777) as the most abundant prey species. The Jacobs index suggested a preference of male tigers for sambar deer (*Cervus unicolor* Kerr, 1792) and wild pig (*Sus scrofa* Linnaeus, 1758) and of the female tigers for wild pig and chital. Bardia National Park has the highest density of tiger prey species (92.6 animals/km^2) among the national parks of Nepal. Still, the density of larger prey species is relatively low. Increasing the density of larger prey like sambar and the reintroduction of larger prey species like gaur (*Bos gaurus* Smith, 1827) can further enhance the tiger population in the park. Our study demonstrates that tigers mostly preyed on wild species, indicating a low level of tiger–livestock interaction. Hence, this park seems to be a prospective area for tiger conservation in a long run.

Keywords

Bardia, diet, DNA analysis, prey preference, tiger

Introduction

The density of carnivores is dependent upon the availability of prey biomass (Fuller & Sievert, 2001; Hayward, O'Brien, & Kerley, 2007; Karanth, Nichols, Kumar, Link, & Hines, 2004; Simcharoen et al., 2014). Prey species composition in the diet of predators is important in knowing prey–predator interactions as well as for studying the role and impact of predation (Odden & Wegge, 2009). Increased prey density helped in increasing the population of Amur tiger (*Panthera tigris altaica* Temminck, 1844; Jiang et al., 2017). Thus, understanding the diet of flagship species like tiger (*Panthera tigris tigris* Linnaeus, 1758) will contribute to better conservation planning, especially for habitat prioritization, protection, and restoration (Kapfer et al., 2011).

The diets of elusive species like tigers are generally assessed by the identification of prey species in scats

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through microscopic hair morphology analysis (Mukherjee, Goyal, & Chellam, 1994; Ramakrishnan, Coss, & Pelkey, 1999). Kerley (2010) reported the use of scat detection dogs for the collection of tiger scat from Russian Far East. Field identification of scats based on size, shape, or smell is sometimes inconsistent and unreliable, as body size of a carnivore can vary greatly within a species. Moreover, the same individual can leave scats of different sizes (Farrell et al., 2000). Sometimes leopard (*Panthera pardus* Linnaeus, 1758) scat can be mistaken for tiger scat. This ambiguity can be overcome by using mitochondrial DNA obtained from scats to distinguish a tiger from a leopard (Bhagavatula & Singh, 2006; Mondol et al., 2009). The sex of felids can also be determined using genomic DNA obtained from scats (Pilgrim, McKelvey, Riddle, & Schwartz, 2005).

Tigers are the largest living felids, with an average body weight of 175 to 260 kg for males and 100 to 160 kg for females in South Asia (Karanth, 2003; Sunquist, 1981). On an average, tigers are estimated to consume 10% of the available prey within their territories per year (Karanth et al., 2004; Sunquist, 1981). An adult male requires 4,000 kg of meat per year (55–60 ungulates), whereas female without cubs consume 3,000 kg/year (40–45 ungulates) (Sunquist, 1981). Female raising three cubs consume >4,500 kg/year (60–75 ungulates; Karanth, 2003; Sunquist, 1981). The home ranges of female tigers are primarily determined by the abundance of prey, whereas the territories which can be defended by a male is a function of the number of female home ranges that can be covered by a male (Karanth, 2003). Throughout, most of the year an adult female is with cubs and in the last 6 months before her young ones are independent, she provides food for three to four adult-sized animals, and in the last 6 months before a female's cub is independent she is killing more prey than a male (Smith, 1993). In social organization of solitary felids, the limiting resource for a female is the availability of food and that for a male is access to females (Odden & Wegge, 2005). With higher prey abundance, the home range of female decreases leading to the increase in density (Simcharoen et al., 2014). Kolipaka, Tamis, van `t Zelfde, Persoon, and de Iongh (2017) reported from Panna Tiger Reserve, Madhya Pradesh, India, that female tigers are mostly confined to the core zone of the park and preferentially target wild prey.

The overall aim of this study was to investigate the diet of tigers in Bardia National Park with the following objectives:

1. To analyze prey species composition in the diet of tigers.
2. To assess the diet composition and prey preferences of male and female tigers.

As male and female tigers may have different dietary requirements and the presence of prey also differs in different habitats, knowing the diet on the basis of sex can be helpful in better conservation planning. Optimal foraging theory formulated by MacArthur and Pianka (1966) discussed a graphical method that allows a specification of specific diet of a predator in terms of the net amount of energy gained from a capture of prey as compared with the energy expended in searching of the prey. Carbone, Teacher, and Rowcliffe (2007) predicted that the transition between diet types in relation to predator's mass may be predicted through the maximization of net energy gain and this can be achieved by large prey feeding strategy. Based on this, we assume that male tigers may be targeting large-sized prey species than female tigers. Our study relates sex of the tiger to its diet and is first of its kind in Nepal. We believe that it will contribute to the conservation of endangered and important flagship species.

Methods

Study Area

Bardia National Park (IUCN, Category II) is the largest national park (968 km^2) in the lowland Terai-Bhabar tract, located on the southwestern part of Nepal (N: 28.2630 to 28.6711; E: 80.1360 to 81.7645; Figure 1). The park was established in 1976 with an area of 368 km^2 as Royal Karnali Wildlife reserve and extended to its current size in 1984. The park was established originally to protect the representative ecosystems as well as to conserve tiger and its prey species (Department of National Parks and Wildlife Conservation [DNPWC], 2017). Karnali and Babai rivers drain through the park. The floodplain grasslands of these rivers support high prey and tiger density. The park is home to more than 30 species of mammals and more than 230 bird species. Bardia is a part of Terai Arc Landscape, a transboundary tiger conservation landscape in India and Nepal, identified as Level 1 tiger conservation unit (Wikramanayake et al., 1998). The density of tigers in Bardia is 3.3/100 km^2 and the prey density is 92.6 animals/km^2 (Dhakal et al., 2014). The main prey species of tigers in Bardia are chital (*Axis axis* Erxleben, 1777), hog deer (*Axis porcinus* Zimmermann, 1780), and wild pig (*Sus scrofa* Linnaeus, 1758), supplemented by barking deer (*Muntiacus vaginalis* Boddaert, 1785), barasingha (*Cervus duvauceli* Cuvier, 1823), and nilgai (*Boselaphus tragocamelus* Pallas, 1766) (Wegge & Storaas, 2009). Leopards are present in lower density compared with tigers and are found primarily in the periphery of the

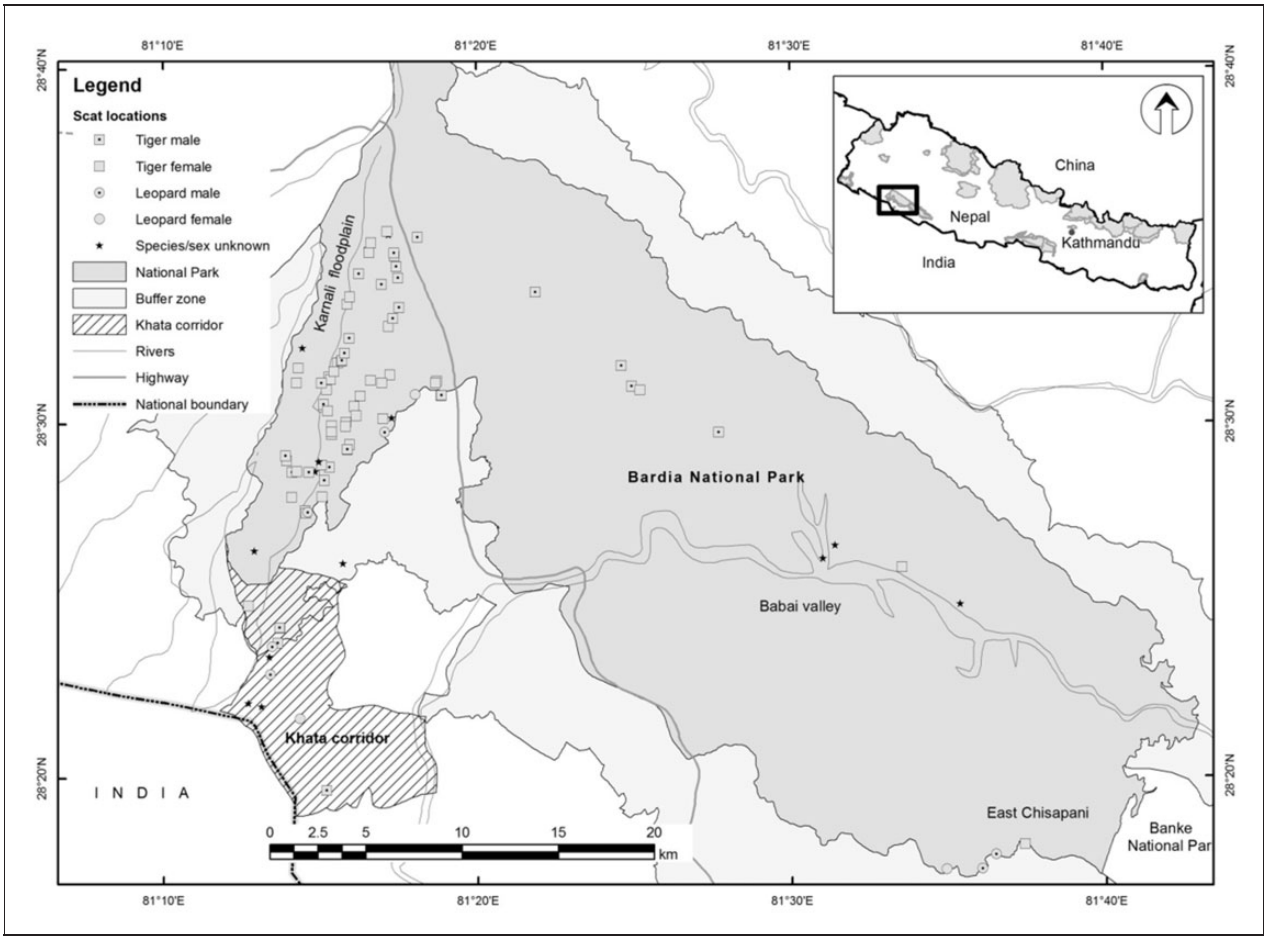

Figure 1. Study area showing the location of scat collection with identification of scat to species and sex level. The rectangle in the inset shows the location of Bardia National Park in the map of Nepal.

park (Odden, Wegge, & Fredriksen, 2010; Wegge, Odden, Pokharel, & Storaas, 2009).

The park has a subtropical monsoonal climate with three distinct seasons, namely, winter (October to February), summer (February to June), and monsoon (June to October). During summer, temperature goes up to 45°C. About 70% of the forest consists of Sal (*Shorea robusta* Gaertn, *1805*) with a mixture of grassland and riverine forests (DNPWC, 2017).

Sample Collection

During January to February 2015 and May to June 2015, we systematically search for scats along forest roads and trails, which are often used by tigers and leopards. We did not collect scats in the summer because the outer mucosal layer from scat required for DNA extraction was readily eaten up by insects (May–June 2015). Hence, we limited our study to samples collected during winter months only. Fresh scats were identified on the basis of the state of mucosal outer layer of the faces (Wasser, Smith, Madden, Marks, & Vynne, 2009). Surveys were repeated (once a week) in Karnali floodplain and in the Khata corridor where tiger density is high (Dhakal et al., 2014; Stoen & Wegge, 1996). We also surveyed Babai valley, East Chisapani, and buffer zones of the national park (Figure 1). Two samples were collected from each scat: one for genetic analysis and another for prey identification. For genetic analysis, the mucosal layer of the scat, which contains sloughed off intestinal cells from the host animal, was collected in vials containing Dithiothreitol EDTA Tris-hydrochloride (DET) buffer (Wultsch, Waits, & Kelly, 2014). The remaining part of the scat was collected in a paper bag to assess the prey species composition. GPS coordinates of the site of sample collection were also recorded. The distinction between tiger and leopard scats in the field was done following earlier studies: Biswas and Sankar (2002); Edgaonkar and Chellam (2002); Karanth and Sunquist (1995); and Lovari, Pokheral, Jnawali, Fusani, and Ferretti (2015). A total of 101 scat samples were collected and 92 were used for diet analysis of tigers.

DNA Extraction and Species and Sex Identification

The scats were pretreated using an Inhibit-EX buffer to adsorb PCR inhibitors. After pretreatment, DNA was extracted using Qiagen QIAamp DNA Mini Fast Stool Kit (Qiagen, Germany) following manufacturers' protocol and finally 150 µl of DNA was eluted. Identification of tiger's and leopard's scats were done by specifically amplifying the mitochondrial DNA regions (Bhagavatula & Singh, 2006; Mondol et al., 2009). Sex identification of tiger and leopard samples was done by amplifying the Amelogenin area on sex chromosome based on the sequencing data available for a domestic cat (Pilgrim et al., 2005).

Diet Analysis

The scat samples were sun-dried and then washed in 1-mm sieve using hot water to separate hair from other organic material. Separated hair was washed in acetone hydrated in 100% ethanol and dried on filter paper (Breuer, 2005; Ramakrishnan et al., 1999). The analysis of predator diets is based upon indigestible remains of prey species, particularly hairs, bones, quills, and feathers. Guard hair is often used for the identification of prey species. From each scat, a predefined minimum of 20 hairs were sampled and hairs were identified on the basis of general appearance, color, relative length, relative width, cortex pigmentation, and medullary width and ratio of the medulla to the cortex in cross-section following Mukherjee et al. (1994). The cortex and medullary pattern of guard hair observed under a trinocular microscope (200×) were compared with photographs from the reference guide prepared by Bahuguna, Sahajpal, Goyal, Mukherjee, and Thakur (2010). The frequency of occurrence of food items in scats was also recorded following Mukherjee et al. (1994). We used genetic analysis to determine if the scat was deposited by a tiger or a leopard and we only used scat deposited by tigers in this study.

Data Analyses and Statistics

The frequency and relative frequency of occurrence were estimated as defined by Lyngdoh et al. (2014). When scats have either single prey species or just two prey species, the frequency of occurrence and the relative frequency of occurrence of prey items give similar results (Bagchi, Goyal, & Sankar, 2003). Therefore, we used the frequency of occurrence of prey species in our analysis. If prey species differ in their body size, then the frequency of occurrence cannot give a proportion of the prey species consumed by predators. We used the nonlinear (asymptotic) model developed by Chakrabarti et al. (2016) for the calculation of biomass consumed per collectable scat or predator weight. The relative biomass (D) and a relative number of prey species consumed (E) were calculated as described by Andheria, Karanth, and Kumar (2007). We used the Fisher's exact test to compare the diet of male and female tiger as well as prey preferences. A binomial logistic regression was used to find the probability of positive DNA result in relation to forest type and the age of the scat. All the aforementioned tests were performed in program R (R Core Team, 2015). The density of prey species was obtained from Dhakal et al. (2014) who used line transect method. The data were analyzed under the distance sampling framework using DISTANCE program version 6. Although density estimation was done in 2013, we assumed that the species density had been stable. Preference of tigers to major prey species was estimated using Jacobs Index (Jacobs, 1974). The value ranges from +1 (for preference) to −1 (for avoidance).

Results

Of 101 scat samples collected, 84 were confirmed as tiger or leopard scats with PCR-based genetic species identification, whereas DNA could not be extracted from the others. The amplified PCR product size was 162 bp for tiger and 130 bp for leopard. The amplified PCR product of nuclear DNA of the male has two bands of size of 194 bp and 214 bp, whereas the female has one band of 214 bp. The site for scat collection in comparison to the results of species and sex identification is shown in Figure 1. The results showed that tiger scats were mostly confined to the core area of the park and in the corridor, whereas leopard scats were present near the park boundary in the buffer zone and in the hills.

The older the scat, the more difficult it was to assess the species and sex using DNA ($p = .009$; Figure 2). The habitat of the scat collection was not significantly related to the results ($p = .450$; Table 1).

Among the 101 scat samples, we used 92 samples for the analysis of tiger's diet because 9 samples were of

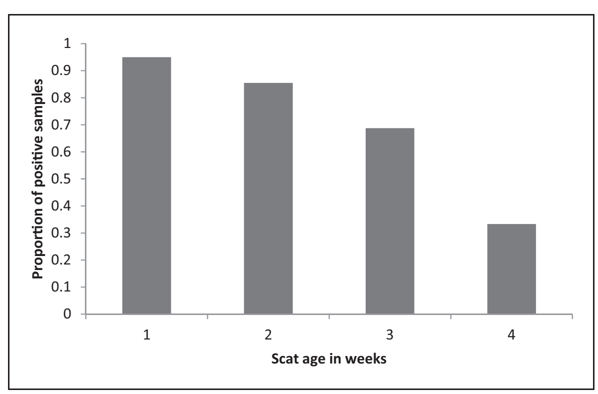

Figure 2. Positive results in DNA test related with the age of scat.

Table 1. Logistic Model Showing the Positivity of DNA Test Depending on the Age of Scat and Habitat (Forest Type).

	df	Deviance	AIC	LRT	Pr (>Chi)
Full model		79.402	91.402		
Scat age	1	86.261	96.261	6.8591	0.008819**
Forest type	4	83.089	87.089	3.6874	0.449964

Note. AIC = Akaike information criterion; LRT = likelihood ratio test.

Table 2. Frequency of Occurrence of Prey in the Diet of Male and Female Tigers.

	Tiger			
Prey species	Male	Female	NI	Total
Sambar	3 (8.6)	1 (2.2)	5 (27.8)	9 (9.2)
Chital	14 (40)	23 (51.1)	3 (16.7)	40 (40.8)
Langur	0 (0)	1 (2.2)	1 (5.6)	2 (2)
Hog deer	4 (11.4)	9 (20)	2 (11.1)	15 (15.3)
Wild pig	6 (17.1)	5 (11.1)	1 (5.6)	12 (12.2)
Four-horned antelope	2 (5.7)	1 (2.2)	0 (0)	3 (3)
Swamp deer	1 (2.9)	0 (0)	0 (0)	1 (1)
Goat	0 (0)	0 (0)	1 (5.6)	1 (1)
Barking deer	0 (0)	0 (0)	1 (5.6)	1 (1)
Buffalo	1 (2.9)	0 (0)	0 (0)	1 (1)
No guard hair	2 (5.7)	2 (4.4)	4 (22.2)	8 (8.1)
Unknown	2 (5.7)	3 (6.7)	0 (0)	5 (5.1)
Total	35 (100)	45 (100)	18 (100)	98 (100)

Note. Values in brackets denote percentage. NI = species and sex not identified by DNA analysis.

leopard, which was confirmed after DNA analysis. Among 92 samples, 8 had no guard hair. From remaining scats, nine wild prey species and two domestic animals (buffalo and goat) were recorded. A single prey species was detected in 32 male and 38 female tiger scats (93.3%), whereas 2 male and 3 female tiger scats had two prey species (6.7%). One unidentified sample also had two prey species in the scat. Detection of single prey species in the scat was regarded as one animal killed and that of two species were regarded as two animals killed (Stoen & Wegge, 1996). Plant materials were found in 14.9% of the scat. We observed that both males and females preyed most frequently upon chital (M: 40% and F: 51%). The other prey species found in the male tiger scat were wild pig (17%), hog deer (11%), sambar (*Cervus unicolor* Kerr, 1792) (9%), and four-horned antelope (*Tetracerus quadricornis* de Blainville, 1816). In the diet of female tigers, chital was followed by hog deer (20%), wild pig (11%), sambar, four-horned antelope, and langur (*Semnopithecus schistaceus* Hodgson, 1840; Table 2).

Swamp deer and buffalo (*Bubalus bubalis* Linneaus 1758) were found only in the male tiger scat and langur in the diet of a female tiger. We recorded only one instance of livestock predation, where a male tiger preyed upon buffalo. The diet of male and female tigers was not significantly different (Fisher's exact test, $p = .363$). Chital made the most abundant relative biomass of the prey species consumed by both male (45.17%) and female (57.86%) tigers (Table 3).

Table 3. Relative Biomass and Relative Number of Prey Consumed by Male (M) and Female (F) Tigers.

Prey	*X* (kg)	Predator	*Z* (kg)	*X/Z*	*Y*	Y_C	*A* (%)	*D* (%)	*E* (%)
Sambar	212	TigerM	235	0.902	0.329	77.427	8.6	9.98	2.21
		TigerF	140	1.514	0.330	46.195	2.2	2.53	0.47
Chital	53	TigerM	235	0.226	0.320	75.314	40.0	45.17	39.92
		TigerF	140	0.379	0.325	45.509	51.1	57.86	43.19
Hog deer	33	TigerM	235	0.140	0.316	74.331	11.4	12.71	18.03
		TigerF	140	0.236	0.321	44.925	20.0	22.35	26.80
Wild pig	38	TigerM	235	0.162	0.317	74.611	17.1	19.13	23.58
		TigerF	140	0.271	0.322	45.106	11.1	12.46	12.97
Four-horned antelope	20	TigerM	235	0.085	0.313	73.470	5.7	6.28	14.71
		TigerF	140	0.143	0.316	44.302	2.2	2.42	4.80
Swamp deer	160	TigerM	235	0.681	0.329	77.232	2.9	3.36	0.98
		TigerF	140	1.143	0.330	46.174	0	0	0
Buffalo	275	TigerM	235	1.170	0.330	77.511	2.9	3.37	0.57
		TigerF	140	1.964	0.330	46.199	0	0	0
Langur	8	TigerM	235	0.034	0.308	72.472	0	0	0
		TigerF	140	0.057	0.310	43.460	2.2	2.38	11.77

Note. A = The frequency of occurrence of the prey species in the scats; X = Mean body mass of the prey (Karanth & Sunquist, 1992; Bhattarai & Kindlman 2012); Z = Mean body mass of the predator (Smith, Sunquist, Tamang, & Rai, 1983); Y = Biomass consumed; ($Y = 0.033–0.025\exp^{-4.284X/Z}$, Chakrabarti et al., 2016); $Y_C = Y$ corrected for predator weight ($Y \times Z$); D = Relative Biomass, $D = \frac{(A \times Y_C)}{\Sigma(A \times Y_C)} \, x\ 100$; E = Relative number of each prey species consumed, $E = \frac{(D/x)}{\Sigma(D/x)} \times 100$.

The Jacobs index for prey preference of female and male tigers suggested preference toward wild pig. Sambar seems to be preferred by male tigers whereas chital by female tigers. Langur seemed to be not a preferred species for both sexes. When we combined both male and female tigers, the preference for wild pig was suggested, followed by sambar and chital (Table 4). However, testing showed no significant difference between prey occurrence in the diet and prey density in the field for males, females, and both combined (Fisher's exact test, $p = 1$).

Discussion

The freshness of scat samples affected the assessment of species and sex positively. We got positive results for 83.16% of the scat samples used for the identification of species and sex of both tiger and leopards as expected (Bhagavatula & Singh, 2006; Mondol et al., 2009). Our results are comparable to those of Borthakur et al. (2011) who reported 84.21% success. Although field identifications are usually correct, the chance of misidentification can always be corrected by DNA analysis.

Five prey species (viz., chital, sambar, wild pig, hog deer, and four-horned antelope) contributed to the diet of tigers. Our findings are similar to the findings of Andheria et al. (2007), who reported that chital, sambar, gaur, and wild pig constituted 96% of the diet of the tiger from Bandipur Tiger Reserve, India (gaur was not available in our study site). We found that chital was the most common prey species of tigers, as Stoen and Wegge (1996) and Wegge, Yadav, and Lamichhane (2018) reported from Bardia. Our results are different to those of Chitwan National Park where sambar was reported as the main prey species (Kapfer et al., 2011).

Table 4. Female and Male Tiger Prey Preference of Major Prey Species in Bardia National Park.

Prey	Frequency of occurrence in diet	Proportion in diet (r)	Prey density[a]	Proportion in field (p)	Jacobs index
Female tiger					
Chital	23	0.767	53.99	0.638	0.301
Sambar	1	0.033	4.45	0.053	−0.234
Wild pig	5	0.167	4.79	0.057	0.538
Langur	1	0.033	21.35	0.252	−0.814
Total	30	1	84.58	1	
Male tiger					
Chital	14	0.609	53.99	0.638	−0.063
Sambar	3	0.130	4.45	0.053	0.460
Wild pig	6	0.261	4.79	0.057	0.709
Langur	0	0	21.35	0.252	−1
Total	23	1	84.58	1	
Combined					
Chital	37	0.698	53.99	0.638	0.134
Sambar	4	0.075	4.45	0.053	0.190
Wild pig	11	0.208	4.79	0.057	0.627
Langur	1	0.019	21.35	0.252	−0.890
Total	53	1	84.58	1	

[a]Dhakal et al. (2014); Jacobs index $= \frac{r - p}{r + p - 2rp}$ (Jacobs, 1974).

Prey availability and body mass were the key determinants of prey preference of tigers in Bardia National Park (Stoen & Wegge, 1996). In our study, we also found that the number of large-sized prey species (sambar) consumed by male tigers were higher than that for female tigers. Similarly, female tigers had relatively more medium-sized prey species (chital) in comparison to a male tiger. Male tigers mainly killed bigger prey species and females killed slightly smaller prey animals, according to their body size (Hayward, Jedrzejewski, & Jedrzejewska, 2012). However, in Bardia, large-sized prey are scarce and patchily distributed which makes energetically costly for searching them, whereas medium-sized prey like chital is very abundant and makes up >80% of available wild herbivore prey (Stoen & Wegge, 1996).

The Jacobs index for the prey preference suggested positive preference of male tigers toward wild pig and sambar and female tigers toward wild pig and chital. However, the chi-square test comparing the diet of male and female tigers was not significant. In the absence of larger prey, the tigers are nonselective (Stoen & Wegge, 1996). Although chital was found to be the most abundant prey in diet of both male and female tigers, it is too small to be an optimal prey for tigers (Hayward et al., 2012). Because of the yarding behavior of chital at night in open areas, they tend to become less vulnerable to stalking predators like tiger and leopard (Johnsingh, 1992).

In our study, livestock was present in a very small proportion of tiger scats, which is comparable to Biswas and Sankar (2002) in Pench National Park and Bhattarai and Kindlmann (2012) in Chitwan National Park. This is remarkable finding, as many other studies report livestock raiding by tigers and leopards (Kolipaka et al., 2017; Seidensticker, 1976; Wang & Macdonald, 2009). One scat of a male tiger collected from Khata corridor that links Bardia National Park with Katarniaghat Wildlife Sanctuary in India had buffalo in the diet. In contrast, Basak et al. (2018) reported from Katarniaghat Wildlife Sanctuary that the frequency of occurrence of large cattle in the diet of tiger was 17.5%, which is very large than our study. Livestock which mainly consisted of cattle and buffalo also contributed to 10.4% of tigers diet in Sariska Tiger Reserve (Sankar et al., 2010). Kolipaka et al. (2017) also found that male tigers were killing more livestock in the buffer zone, whereas female tigers mostly relied upon wild prey in the core zone of the Panna Tiger Reserve, India. We also found plant materials in the scat. The presence of plant material in 15% of the scat may be due to accidental consumption of plant along with the main prey

(Rajaratnam, Sunquist, Rajaratnam, & Ambu, 2007). It is also believed that plant materials aid in the digestion, and the fiber present makes it easy for the animals to defecate. Plant materials were also reported from the scat of leopards and tigers of Sariska Tiger Reserve (Sankar & Johnsingh, 2002).

The density of large ungulates is low in Bardia. It is possible to have high densities of large ungulates in successional and disturbed forests if poaching is under control (Karanth & Sunquist, 1992). Tigers cannot sustain and reproduce in large numbers in the absence of large prey species even when small prey species are quite abundant (Karanth & Sunquist, 1995; Sunquist, 1981). Seidensticker (1986) reported from Java that one of the main reasons for the decline of Javan tiger was a decline in the abundance of larger prey. Thus, to increase the carrying capacity of tigers as a global source sites (Walston et al., 2010), Bardia should focus on increasing the density of large-sized prey species along with the reintroduction of gaur in the near future as well as maintain the chital and wild pig population.

Understanding the diet of tiger has great implication on tiger conservation. However, this study is short as it covers just one season. Prey density estimation data were taken from the study carried out by park authority; however, we assume that there is no significant variation in the predator diet and the prey density because it was taken during the same season. Simultaneous study of prey density and predator diet should be done in near future to come up with a clear picture in multiple prey–predator environment. The home range of tiger changes with season as well as the prey preferences; therefore, a thorough study covering all season is needed along with regular scientific monitoring of the prey and predator population. This will provide crucial information required for better management to the park officials and help in long-term conservation of tigers in Nepal.

Implications for Conservation

The population of tigers have declined worldwide as a result of prey depletion. Prey density is important for the maintenance of large carnivore populations (Sankar et al., 2010). Accurate knowledge of diet of a species is important for effective conservation and is important for conservation initiative like habitat prioritization, protection, and restoration (Kapfer et al., 2011). The diet of tigers can be helpful in knowing about the home range and carrying capacity of a park. Nepal is one of the 13 countries to ratify the Global Tiger Recovery Plan at the meeting of world leaders held in St. Petersburg in 2010 which aims at doubling the number of wild tiger by 2022. Bardia National Park is regarded as one of the global source sites for tigers. Therefore, to increase the carrying capacity of the park, we need to focus on increasing the number of larger prey species. On the basis of our results, we suggest that future studies of tiger diet should be of longer duration and cover a wide area in order to understand the spatiotemporal variation in tiger diet (Kapfer et al., 2011).

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