LIVESTOCK SUBSIDIZE TIGER DIETS IN A CENTRAL INDIAN CORRIDOR: IMPLICATIONS FOR HUMAN-WILDLIFE CONFLICT MANAGEMENT AND CONSERVATION PLANNING

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ABSTRACT

Large carnivores, like tigers, maintain a balance within their respective ecosystem and play a critical role. However, due to their life history needs and extensive overlap with humans, they face significant threats across their distribution. These threats become severe when they inhabit non-protected areas like corridors and kill livestock. In this study, the food habits of tiger were assessed across the multi-use Kanha-Pench corridor (KPC) in Central Indian Landscape. The prey species were identified through tricho-taxonomy using 146 genetically and morphologically confirmed tiger faecal samples. A total of 17 prey species were identified, which is much higher when compared to other available studies. Additionally, tigers were also found to prey on five species (sloth bear, striped hyena, smooth-coated otter, small Indian civet, and Indian grey mongoose), which are often rare in the tiger diet. Among 17 prey species, six large-bodied prey were found to be contributed in 86.98% (relative frequency of occurrence) and 92.71% (biomass) of the tiger diet. Cattle was identified as the most preferred prey species followed by chital and nilgai. Spatial analysis identified four cattle predation hotspots across KPC. This study highlighted the opportunistic behaviour of tigers and their high dependency on cattle when it persists in a multi-use habitat. Therefore, these findings have significant management implication to conserve this large carnivore in a multi-use and non-protected habitat.

Keywords: *Panthera tigris*, trophic ecology, prey selection, biomass, relative frequency of occurrence, shared landscape, management recommendations, carnivore conservation

1. INTRODUCTION:

Large carnivores strongly shape ecological interactions within their respective ecosystems (Steneck 2005). Over the past century, large carnivores have faced significant threats across their range due to their life-history needs (e.g. adequate prey, large home ranges, territorial dynamics) (Linnell et al. 2001; Macdonald & Sillero-Zubiri 2002; Ripple et al. 2014). Extensive overlap between people and large carnivores often leads to human–carnivore conflict (Inskip & Zimmermann 2009; Bhattarai & Fischer 2014), manifested as livestock depredation, human attacks, and carnivore mortalities (Patterson et al. 2004; Inskip & Zimmermann 2009). While large carnivores face diverse pressures world over, these problems are particularly severe for tigers (*Panthera tigris*) given the species prominence in illegal wildlife trade, combined with extensive overlap with people in densely populated and fragmented landscapes, making tigers particularly vulnerable (Thinley et al. 2021). India currently supports approximately 70% of the world's tigers (Goodrich et al. 2022), and about one-third of this current tiger population occurs outside protected areas (PAs) (Qureshi et al. 2023). Tigers that dwell within PAs are also exposed to extensive habitat edges adjoining human settlements and agricultural fields (Miller et al. 2015; Jhala et al. 2020; Qureshi et al. 2023). Even as tiger populations have recovered in several PAs across India, vast swathes of habitat (84%) remain unoccupied or are associated only with transient tiger presence (Jhala 2025). Historic and ongoing poaching of tigers and their prey, along with other anthropogenic pressures, have contributed to the species' absence or small population sizes across large parts of its range. Additionally, habitat fragmentation and the loss of vital corridors have driven tiger declines and exacerbated extinction risk (Thatte et al. 2018).

Wildlife corridors are essential to sustain tiger metapopulations and enable species recovery in fragmented landscapes (Wikramanayake et al. 2004; Biswas et al. 2022). Corridors typically connect PAs, lie outside PA boundaries, and encompass diverse land-use types, including multi-use forests, privately owned agricultural land, plantations, revenue land, and village commons (Qureshi et al. 2023). Corridors vary greatly in form and function: some are small, well-vegetated linkages that tigers can traverse rapidly (e.g. the Kaziranga–Karbi Anglong corridor: Sharma & Sarma 2014), whereas others are extensive landscapes capable of supporting resident breeding tiger populations (Jena et al. 2011). Dispersing tigers may spend extended periods—spanning days, weeks or months—within corridors, and successful dispersal requires that individuals meet their energetic and nutritional demands (Sharma et al. 2013). Given extensive spatial overlap among people, livestock and tigers in many corridors, the prevalence of conflict is high, with livestock depredation being common and attacks on humans occurring more occasionally (Gurung 2008; Dhanwatey et al. 2013). Adverse human–tiger interactions erode local support for conservation and can trigger retaliatory killing and poaching (Ogra & Badola 2008; Inskip & Zimmermann 2009).

There is growing evidence of the high prevalence of livestock in tiger diets across various regions of India (e.g. Karanth & Sunquist 1995; Bagchi et al. 2003; Andheria et al. 2007; Avinandan et al. 2008; Mondal et al. 2012; Doubleday 2018; Sarkar et al. 2018; Ramesh et al. 2019; Bakhshi 2020). There is also increasing recognition that livestock depredation can generate adverse socio-ecological feedback (Bhandari 2023), particularly where livestock constitute a substantial component of tiger diets (Biswas et al. 2023). In some contexts where wild prey is relatively abundant, tigers may still selectively prey on livestock as an energetically efficient foraging strategy (Kolipaka et al. 2017). In other areas where wild prey occurs at low densities, tigers may be sustained primarily by domestic and feral livestock (Kolipaka et al. 2017).

The Kanha–Pench Corridor (KPC) in central India is one of the country's best-known wildlife corridors. This approximately 2500 km² habitat supports a resident tiger population and has facilitated dispersal between two protected areas (PAs) that cumulatively (KPC, Kanha Tiger Reserve, and Pench Tiger Reserve) hold over 280 tigers (Jena et al. 2014; Madhya Pradesh Forest Department 2015; Qureshi et al. 2023). The forest divisions and forest development corporations within this corridor accommodate human settlements and local resource use, and support a large number of livestock (Nayak 2015). Additionally, KPC supports diverse wild felids, including leopard (*Panthera pardus*), wild canids, including the wild dog (*Cuon alpinus*), jackal (*Canis aureus*), and Indian fox (*Vulpes bengalensis*), as well as wild ungulates such as gaur (*Bos gaurus*), sambar (*Rusa unicolor*), chital (*Axis axis*), wild pig (*Sus scrofa*), chousingha (*Tetracerus quadricornis*), barking deer (*Muntiacus muntjak*), nilgai (*Boselaphus tragocamelus*), and the northern plains langur (*Semnopithecus entellus*) (Rathore et al. 2012; Dhamorikar et al. 2017; Srivathsa et al. 2019; Talegaonkar et al. 2021).

Given the importance of KPC, several studies have been conducted in the corridor in recent years. Previous research has generated evidence on tiger occurrence and corridor use (Puri et al. 2022; Borah et al. 2015; Galodha et al. 2022), assessed structural and functional connectivity using genetic evidence (Rathore et al. 2012; Sharma et al. 2013; Dutta et al. 2015; Thatte et al. 2018; Puri et al. 2021), documented genetic diversity (Sharma et al. 2009), investigated patterns and drivers of human–wildlife conflict (Srivathsa et al. 2023), and examined the impacts of livestock grazing (Nayak et al. 2015). However, no study has explicitly assessed tiger food habits within this corridor.

Against this background, two pressing questions arise to guide tiger conservation and strengthen management. First, what is the relative contribution of domestic and wild prey species to tiger diets in KPC? Second, where are the hotspots of livestock predation? The outcomes of this study will enable managers to make informed decisions to mitigate human–tiger conflict across KPC and facilitate tiger dispersal between Kanha and Pench Tiger Reserves, thereby supporting their long-term persistence.

2. MATERIALS AND METHODS

2.1. Field permission

All required permissions for the field survey and primary data collection were granted by the Madhya Pradesh Forest Department (letter no. 8617, dated 29 September 2023). Given the non-invasive nature of the study, formal ethical clearance was not required.

2.2. Study area

The Kanha–Pench Corridor (KPC) in central India spans approximately 2500 km² and connects two major tiger reserves of Madhya Pradesh: Kanha Tiger Reserve and Pench Tiger Reserve (Dutta et al. 2015) (Fig. 1). Administratively, the corridor encompasses the North Balaghat Forest Division, South Balaghat Forest Division, South Seoni Forest Division, West Mandla Forest Division, Lamta Forest Development Corporation, Barghat Forest Development Corporation and Mohgaon Forest Development Corporation (Patil et al. 2023; Madhya Pradesh Forest Department 2015). Recent estimates suggest that approximately 100 tigers (>1 year of age) inhabit the KPC (Qureshi et al. 2023).

Livestock densities within the corridor are estimated at 2.37 ± 0.56 cattle per km² and 1.50 ± 0.54 goats per km², and approximately 1500 livestock depredation events per year (mean for 2018–2022) are attributed to tigers and leopards (Madhya Pradesh Forest Department) (https://mpforest.gov.in/Intranet/login.aspx?ReturnUrl=%2fIntranet%2fWLFOM+S%2ffrmViewD4.aspx).

At least 715 villages are embedded within KPC forests, with a mean population size of 845 people per village (Patil et al. 2023). Residents primarily belong to the Gond, Baiga, Pardhi, Bharia and Bhil communities. Local livelihoods include subsistence agriculture, harvesting of non-timber forest products such as flowers of mahua (*Madhuca longifolia*), leaves of tendu (*Diospyros melanoxylon*), fruits of amla (*Phyllanthus emblica*), chironji (*Buchanania cochinchinensis*), harra (*Terminalia chebula*) and bahera (*Terminalia bellirica*), and seasonal migrant labour (Mahapatra & Tewari 2005).

2.3. Sample collection, species confirmation and prey identification

Field sampling was conducted across all potential tiger-occupied areas of the KPC, based on recent records of tiger presence (Qureshi et al. 2023), during January and February 2024. In total, 2547 km² of potential tiger habitat was surveyed (Madhya Pradesh Forest Department 2015; Dutta et al. 2015) (Fig. 1), and forest beats (the smallest administrative unit) were used as sampling units. Additional surveys were conducted in the buffer of Pench Tiger Reserve, Madhya Pradesh, and in the southern part of Kanha Tiger Reserve (Fig. 1).

Field teams comprising frontline forest department staff and trained biologists systematically surveyed forest trails within each beat and collected relatively fresh large carnivore faecal samples (identified by the presence of moisture and odour) using wax paper for storage (Biswas et al. 2019). For each sample, GPS coordinates and details of the compartment, beat, range and division were recorded, along with the suspected species (tiger or leopard) (Biswas et al. 2022).

Species identification in the field was based on associated indirect signs (pugmarks and scrape marks) and scat characteristics, including shape, diameter and segmentation pattern (Karanth & Sunquist 1995; Bagchi et al. 2002; Biswas & Sankar 2002), following the protocol described by the National Tiger Conservation Authority (Jhala et al. 2009). Survey effort varied between

8 and 10 km per beat, depending on habitat availability (Biswas et al. 2022). All collected faecal samples were stored in dry containers during transport and subsequently preserved at −20 °C in the laboratory until further processing (Biswas et al. 2019).

In the laboratory, 10% of the total samples were genetically identified using tiger-specific molecular markers (Mukherjee et al. 2007) to maximise the likelihood that only tiger samples were included in the microhistological analysis. For genetic identification, DNA was extracted from field-collected large carnivore faecal samples using a modified Qiagen DNA extraction protocol (Biswas et al. 2019), and two tiger-specific mitochondrial DNA markers (Tig490F/R and Tig509F/R) were used (Mukherjee et al. 2007).

Based on the morphological characteristics (shape, diameter and segmentation pattern) of genetically confirmed tiger samples and associated field signs (pugmarks and scrape marks), the remaining samples were classified, and only confirmed tiger samples were selected for dietary analyses (Bagchi et al. 2002; Biswas & Sankar 2002).

Tiger faecal samples were then dried under direct sunlight for one week. Undigested remains (hair, bone fragments and hooves) were separated by sieving the dried samples through a sterile 0.5-mm stainless steel mesh (Biswas et al. 2023). Permanent slides were prepared using primary guard hairs to identify prey species (Biswas et al. 2023), and medulla and cuticle structures were examined under a microscope following established protocols (Mukherjee et al. 1994; Karanth & Sunquist 1995; Biswas & Sankar 2002; Avinandan et al. 2008; Bahuguna et al. 2010).

Sample size adequacy for diet analysis was assessed using rarefaction curves (Hurlbert 1971; Heck et al. 1975) in R version 4.0.2 using the package vegan (Oksanen et al. 2013).

2.4. Data analysis

Relative frequency of occurrence (RFO) of prey species (Mukherjee et al. 1994), prey biomass (Andheria et al. 2007), and prey preference (Sankar et al. 2010) were calculated. RFO was estimated using the following formula, where i represents the number of samples in which a given prey species occurred, and j represents the total frequency count of all prey species (Kruuk 1989; Mukherjee et al. 1994):

$$\mathrm{RFO} = (i / j) \times 100$$

Prey biomass was calculated to correct for the potential overestimation of small-bodied prey species in RFO analysis (Andheria et al. 2007; Chakrabarti et al. 2016) using Ackerman's equation:

$$Y = 1.98 + 0.035X$$

where Y represents the weight of prey consumed per faecal sample and X represents the mean body mass of a given prey species (Ackerman et al. 1984; Karanth & Sunquist 1995). Mean body masses of prey species were obtained from published literature across relevant landscapes.

Relative biomass (D) of each prey species was calculated following Karanth & Sunquist (1995) and Andheria et al. (2007) using the formula:

$$D = (A \times Y / \Sigma(A \times Y)) \times 100$$

where A represents the RFO of each prey species and Y represents the estimated weight of prey consumed per faecal sample.

Tiger prey preference across the corridor was calculated using Ivlev's electivity index (Ivlev 1961):

$$E = (r - p) / (r + p)$$

where r represents prey utilisation (RFO) and p represents prey availability in the study area. Values of E range from −1 (complete avoidance) to +1 (complete selection). Prey density estimates were obtained from the Madhya Pradesh Forest Department (2022) collected during the All India Tiger Estimation exercise.

Kernel density estimation (KDE) was used to spatially map the prevalence of domestic prey species in tiger faecal samples across the KPC. This approach converts discrete point data into a continuous density surface (Silverman 1986; Hart & Zandbergen 2014). KDE analysis was conducted in ArcGIS Pro version 3.1.0, with output cell values set to “Densities” and “Geodesic” method was selected.

3. RESULTS:

3.1. Prey species wise relative frequency of occurrence in tiger faecal samples across Kanha-Pench Corridor:

A total of 349 large carnivore faecal samples were collected from the KPC (Supplementary Fig. 1). Of these, 35 samples (10%) were randomly selected for genetic confirmation, of which 20 were confirmed as tiger origin using tiger-specific molecular markers.

An additional 140 samples were classified as tiger faeces based on morphological similarity (size and appearance) to genetically confirmed samples and the presence of associated indirect field signs (scrape, pug and spray marks) (Bagchi et al. 2002; Biswas & Sankar 2002). Consequently, a total of 160 tiger faecal samples were included in the analysis.

The remaining 189 samples could not be unambiguously attributed to tigers based on morphological characteristics and field evidence and were therefore excluded from further analyses. Of the 160 confirmed tiger samples, 14 did not contain sufficient hair remains for prey identification, and the remaining 146 samples were used for dietary analysis (Fig. 1).

Based on microhistological analysis of hair from the 146 tiger faecal samples, 17 prey species (14 wild and 3 domestic) were identified (Supplementary Table 1), belonging to five mammalian orders: (1) Artiodactyla (cattle, chital, nilgai, goat, wild pig, sambar, gaur and chousingha); (2) Carnivora (striped hyena, Indian grey mongoose, sloth bear, dog, smooth-coated otter and small Indian civet); (3) Lagomorpha (rufous-tailed hare); (4) Primates (northern plains langur); and (5) Rodentia (rodents) (Fig. 2; Table 1).

Eight of the 17 prey species were large-bodied, whereas nine were small-bodied (Table 1). Cattle were the most prevalent species in tiger faecal samples (RFO = 37.33%), followed by chital (12.33%) (Table 1). Cattle also contributed the highest relative biomass (57.39%), followed by nilgai (12.83%) (Table 1).

The combined RFO and relative biomass of the six principal ungulate species (sambar, chital, nilgai, wild pig, cattle and goat) were 86.98% and 92.71%, respectively, indicating that these species constituted the majority of tiger diets within the corridor (Table 1).

3.2. Prey preference across the Kanha–Pench Corridor

Prey preference was estimated for six species (chital, sambar, nilgai, wild pig, cattle and goat), as these species were highly prevalent in tiger diets and corresponding density estimates of 2022 were available. Among these primary prey species, cattle (Ivlev’s electivity index = 0.84) was identified as the most preferred prey species, followed by chital (0.59) and nilgai (0.57) (Table 2; Fig. 3). The rarefaction curve approached an asymptote at approximately 150 samples, indicating that no additional prey species were detected with increased sampling effort (Supplementary Fig. 2).

3.3. Hotspots of domestic prey predation by tigers

Kernel density estimation (KDE) analysis identified four cattle depredation hotspots encompassing parts of 10 forest ranges: Lamta and Ukwa ranges of the Lamta Forest Development Corporation, West Baihar and South Lamta ranges of the North Balaghat Forest Division, Logur, Balaghat, Lalburra, Katangi and Wara Seoni ranges of the South Balaghat Forest Division, and Behrai range of the Barghat Forest Development Corporation. Livestock predation incidence was comparatively higher within these identified hotspots across the KPC (Fig. 4; Table 2).

4. DISCUSSION:

This study represents one of the first comprehensive assessments of tiger diets within a wildlife corridor of the central Indian landscape. The documentation of 17 prey species in tiger diets in the KPC is of considerable conservation and management interest, given that lower number of prey species have been reported from several prominent tiger reserves in central India and elsewhere in the country. For example, eight prey species were recorded in Ranthambhore National Park (Bagchi et al. 2003), nine in Sariska Tiger Reserve (Mondal et al. 2007), 12 in Bandipur Tiger Reserve (Andheria et al. 2007), 11 in Mudumalai Tiger Reserve (Ramesh et al. 2009), 14 in Buxa Tiger Reserve (Sarkar et al. 2018) and nine in Bandhavgarh Tiger Reserve (Navaneethan et al. 2019). The number of prey species recorded in KPC was also higher than that reported in a landscape-scale study, where Biswas et al. (2023) identified 11 prey species across the Terai–Arc landscape of northern India. Interestingly, the dietary breadth of tigers in KPC appears broader than that documented for leopards in several Indian landscapes. Athreya et al. (2014) reported 11 prey species in Ahmednagar district, western Maharashtra, while Kshettry et al. (2018) documented 14 prey species in Gorumara National Park, north-east India.

However, such comparisons should be interpreted cautiously, as dietary breadth may vary with study area size, predator density, and prey availability.

The occurrence of 17 prey species in tiger diets in KPC suggests that tigers explored a wide range of available prey in the corridor’s multi-use forests, although they primarily selected large-bodied domestic and wild bovids and cervids (Sunquist 1981; Biswas & Sankar 2002; Chatterjee et al. 2022; Biswas et al. 2023). High mammalian diversity and substantial livestock presence within KPC have previously been documented (Vattakavan 2010; Jena et al. 2011) and support this claim. Additionally, remains of opportunistic prey species, including small Indian civet, Indian grey mongoose, smooth-coated otter, striped hyena and sloth bear, were detected in the faecal samples (Fig. 2; Table 1). Collectively, these findings highlight the importance of assessing tiger diets in wildlife corridors and other multi-use forest systems.

A key finding of this study is the extensive reliance of tigers in KPC on cattle. Such dependence may confer short term energetic or demographic benefits, particularly given the relatively low abundance of large-bodied wild prey in parts of the corridor. The relative contribution of domestic animals observed here is plausibly among the highest reported across published tiger diet studies (Table 3). This finding is also consistent with the substantial number of ex gratia payments made for livestock depredation within KPC (Madhya Pradesh Forest Department) (https://mpforest.gov.in/Intranet/login.aspx?ReturnUrl=%2fIntranet%2fWLFOM+S%2ffrmViewD4.aspx).

The pronounced reliance on cattle warrants further investigation. Several factors merit examination, including spatial distribution and density of cattle, grazing practices, landscape features that may increase cattle vulnerability, and patterns of tiger space use. Recent studies suggest that the invasive shrub *Lantana camara* around villages near Kanha Tiger Reserve may provide cover facilitating livestock predation (Talegaonkar et al. 2021). Additional factors requiring assessment of wild prey distribution, tiger density, land tenure systems and breeding status is crucial.

Extensive livestock predation may also pose risks to tiger conservation. First, there is potential for retaliatory killing or persecution by affected cattle owners. Although recorded unnatural tiger mortality appears to show a declining trend in the region (Madhya Pradesh Forest Department) (https://mpforest.gov.in/Intranet/login.aspx?ReturnUrl=%2fIntranet%2fWLFOM+S%2ffrmViewD4.aspx), possibly due to timely compensation disbursement however, the risk of retaliation persists. Second, the close interface between cattle and wild tigers may increase the likelihood of zoonotic disease transmission in both directions, potentially leading to unexpected mortality events (Martin et al. 2011; Khanyari et al. 2021). Feral dogs scavenging on cattle carcasses killed by tigers may further amplify disease transmission risk (Cleaveland et al. 2000). Further, identifying individual tigers repeatedly involved in cattle depredation and developing targeted, individual-based management strategies may help to mitigate human–tiger conflict in shared landscapes (Chhattani et al. 2025).

4.1. Management Recommendations

This study demonstrates that cattle may disproportionately sustain tiger populations in parts of the species' range in India, particularly outside protected areas (PAs), where densities of wild ungulates are relatively lower. Ten forest ranges across two forest divisions and two forest development corporations were identified as cattle depredation hotspots, where timely compensation disbursement is critical.

The Lamta and Barghat Forest Development Corporations currently do not process compensation independently and instead rely on the South Balaghat and South Seoni Forest

Divisions, respectively, for the disbursement of ex gratia payments, potentially leading to delays. Granting forest development corporations administrative authority to process compensation payments directly may expedite relief to affected livestock owners in critical sections of the corridor.

Monitoring cattle depredation events using camera traps is recommended to confirm carnivore presence and reduce the risk of misattribution or secondary scavenging incidents. Additionally, a systematic assessment of ungulate densities within KPC is necessary to track wild prey abundance and evaluate long-term prey availability.

Comprehensive assessment of zoonotic disease transmission among carnivores, herbivores, cattle and feral dogs is also recommended. Such surveillance would help identify potential disease hotspots and inform targeted vaccination campaigns for cattle and feral dogs. Integrating wildlife health monitoring into corridor management plans, as well as tiger conservation plans for KPC, Kanha Tiger Reserve and Pench Tiger Reserve, will be essential.

Finally, KPC should be recognised as a priority corridor within the central Indian landscape for enhanced conservation investment. This should include systematic monitoring of tigers and their principal prey species, including livestock, by the State Forest Department under the National Tiger Conservation Authority’s Tigers Outside Tiger Reserves programme.

4.2. Conclusion

This study demonstrates that tigers persisting within the Kanha–Pench Corridor exhibit high dietary plasticity in a multi-use landscape, with a marked dependence on livestock, particularly cattle. Although a diverse prey assemblage of 17 species was documented including several rarely reported taxa the diet was overwhelmingly dominated by large-bodied prey, and spatial analysis identified discrete hotspots of cattle predation. These findings underscore the adaptive food habits of tigers in human-modified and, multi-use habitats while simultaneously revealing the ecological and socio-economic pressures shaping their persistence outside PAs.

From a conservation science and landscape-level management perspective, the study provides spatially explicit, evidence-based insights critical for carnivore conservation in a shared landscape. The identification of cattle predation hotspots enables targeted conflict mitigation, optimised allocation of conservation resources, and prioritisation of intervention zones. Furthermore, the demonstrated reliance on cattle highlights the urgent need to strengthen wild prey populations, improve habitat quality, and integrate cattle management reforms within the corridor.

For institutions engaged in science-driven conservation, this work contributes empirical data supporting coexistence-based strategies in multi-use habitats. It reinforces the necessity of integrating ecological monitoring with socio-ecological frameworks to ensure long-term viability of wide-ranging carnivores in human-modified landscapes. Continued tiger monitoring, coupled with prey availability assessments and community-level engagement, will be essential to translate these findings into scalable conservation outcomes across similar corridor systems globally.

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6. AUTHOR CONTRIBUTION:

SB conceptualised, designed methodology, performed statistical analyses, prepared tables and figures, led the writing of the manuscript, reviewed & edited, supervised, managed project administration, and approved the final draft. SD generated diet data, wrote the original draft, formatted the manuscript, prepared tables, and approved the final draft. PC led the writing of the manuscript, reviewed & edited, and approved the final draft. NR supervised the diet data generation, managed project administration, and approved the final draft. KKJ generated molecular data, supervised, managed project administration, and approved the final draft. UKD collected field data and approved the final draft. DG analysed the prey density data and approved the final draft. SD, LK, and SS supervised, managed project administration, and approved the final draft.

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8. DATA AVAILABILITY STATEMENT

The data that support the findings of this study is available from the corresponding author upon reasonable request. Precise geographic coordinates of tiger faecal samples and identified predation hotspots have been withheld to ensure species protection and to prevent potential misuse. Derived dietary datasets and analytical outputs are provided within the article and its supplementary materials.

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Figure and Table Legends

Fig. 1

Spatial distribution of confirmed tiger faecal samples collected across the Kanha–Pench Corridor, during January–February 2024. Blue points represent locations of all faecal samples collected (n = 146).

Fig. 2

Relative frequency of occurrence (% RFO) of prey species identified from tiger (*Panthera tigris*) faecal samples (n = 146) in the Kanha–Pench Corridor. Bubble size corresponds to the relative frequency of occurrence of each prey species. A total of 17 prey species (14 wild and three domestic) were identified through micro-histological analysis. Cattle contributes the most to the tiger diet, followed by chital, nilgai, goat, wild pig, and sambar.

Fig. 3

Preference (Ivlev's electivity index) analysis of primary prey species of tigers in the Kanha–Pench Corridor identified cattle as the most preferred prey, followed by chital and nilgai. Ivlev's index values range from −1 (complete avoidance) to +1 (strong selection).

Fig. 4

Kernel density estimation map showing spatial hotspots of cattle depredation by tigers across the Kanha–Pench Corridor. Darker blue shading represents a higher density of cattle occurrences in tiger faecal samples.

Table 1

Relative frequency of occurrence (% RFO), estimated biomass contribution, and relative biomass of prey species identified from tiger faecal samples (n = 146) in the Kanha–Pench Corridor. Mean prey body weights were obtained from published literature, and prey biomass was estimated using Ackerman's equation.

Table 2

Details of forest ranges and their respective divisions within the Kanha–Pench Corridor were identified as hotspots of cattle depredation by tigers based on kernel density estimation analysis. Hotspot numbers correspond to locations shown in Figure 5.

Table 3

Comparison of prey species richness and relative frequency of occurrence (% RFO) of livestock found in tiger diets reported across published studies from tiger landscapes of India and the present study.

Supplementary Fig. 1

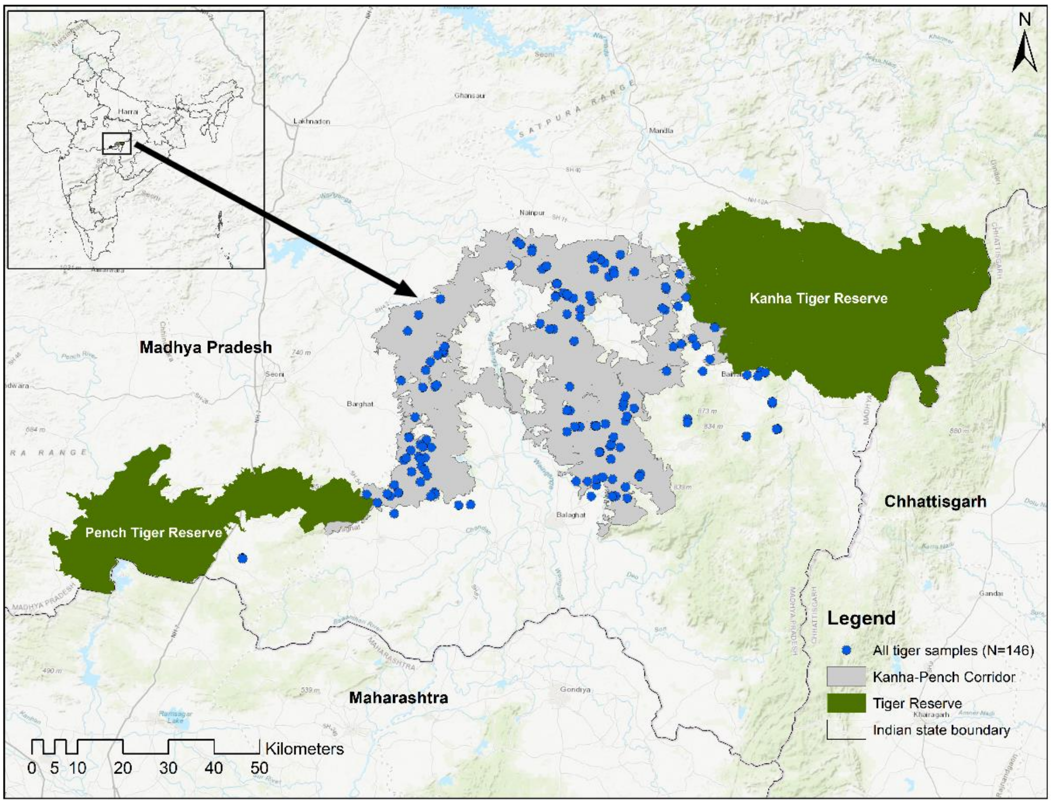
Spatial distribution of large carnivore faecal samples collected across the Kanha–Pench Corridor, during January–February 2024. Red points represent locations of all faecal samples collected (n = 349).

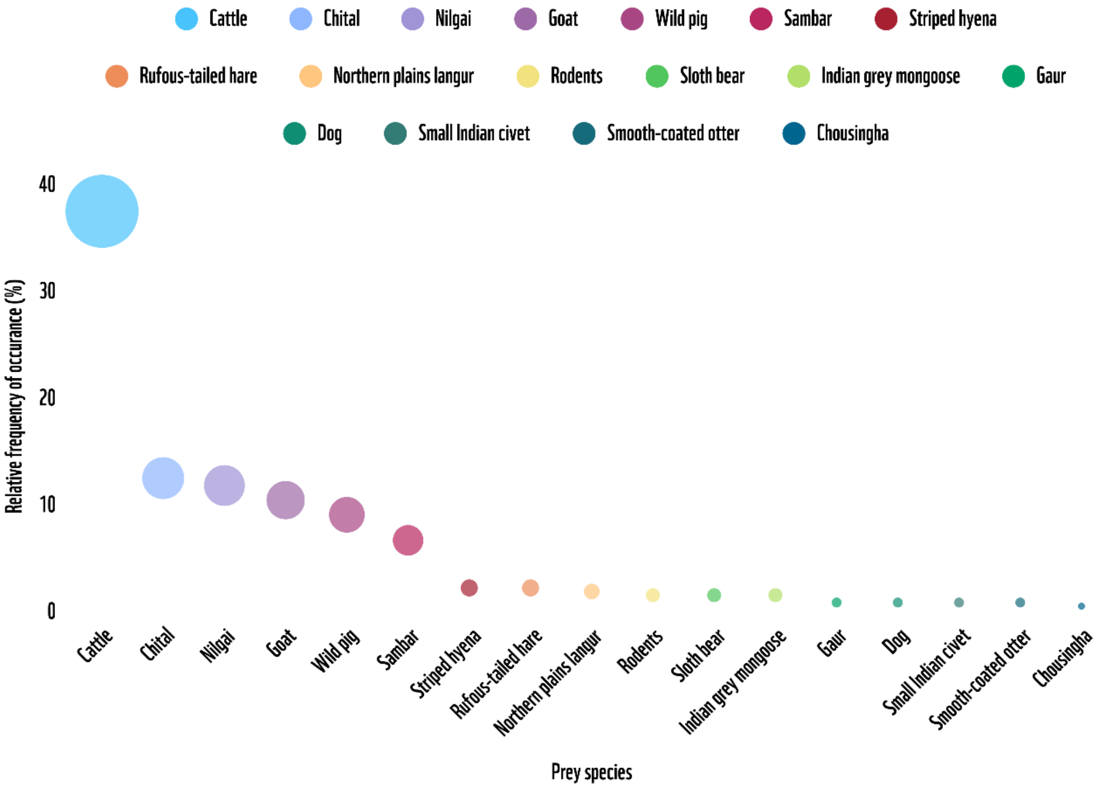
Supplementary Fig. 2

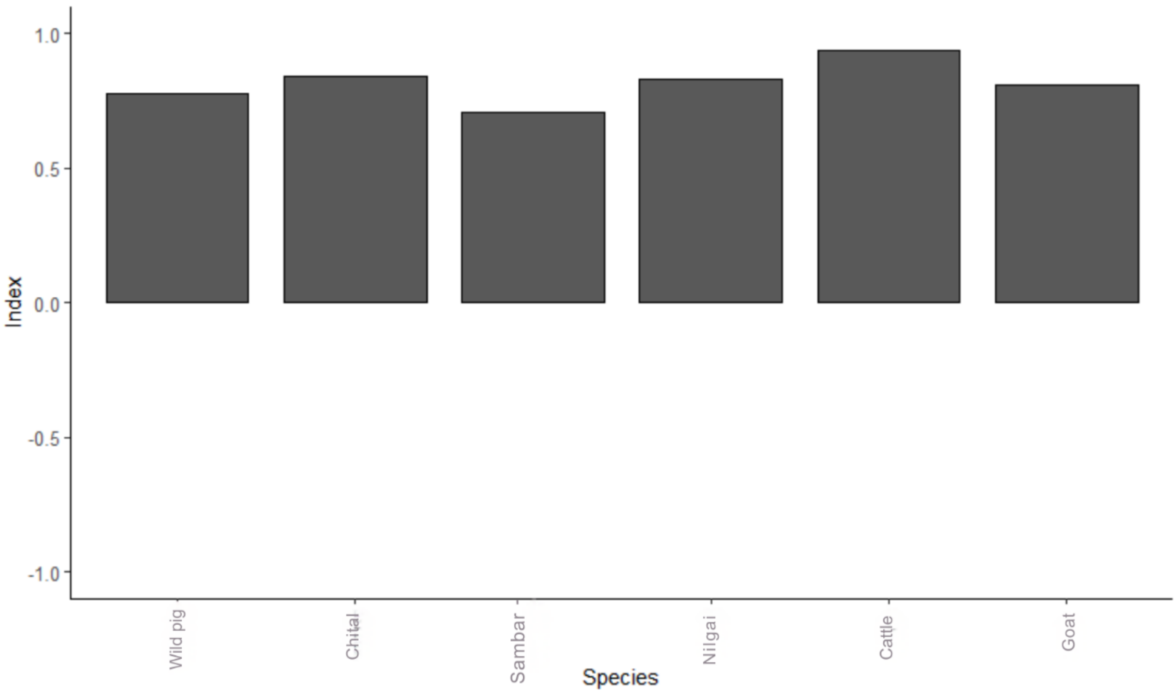
Rarefaction curve showing accumulation of prey species with increasing number of tiger faecal samples analysed (n = 146) in the Kanha–Pench Corridor. The curve indicates saturation of prey species detection at approximately 150 samples.

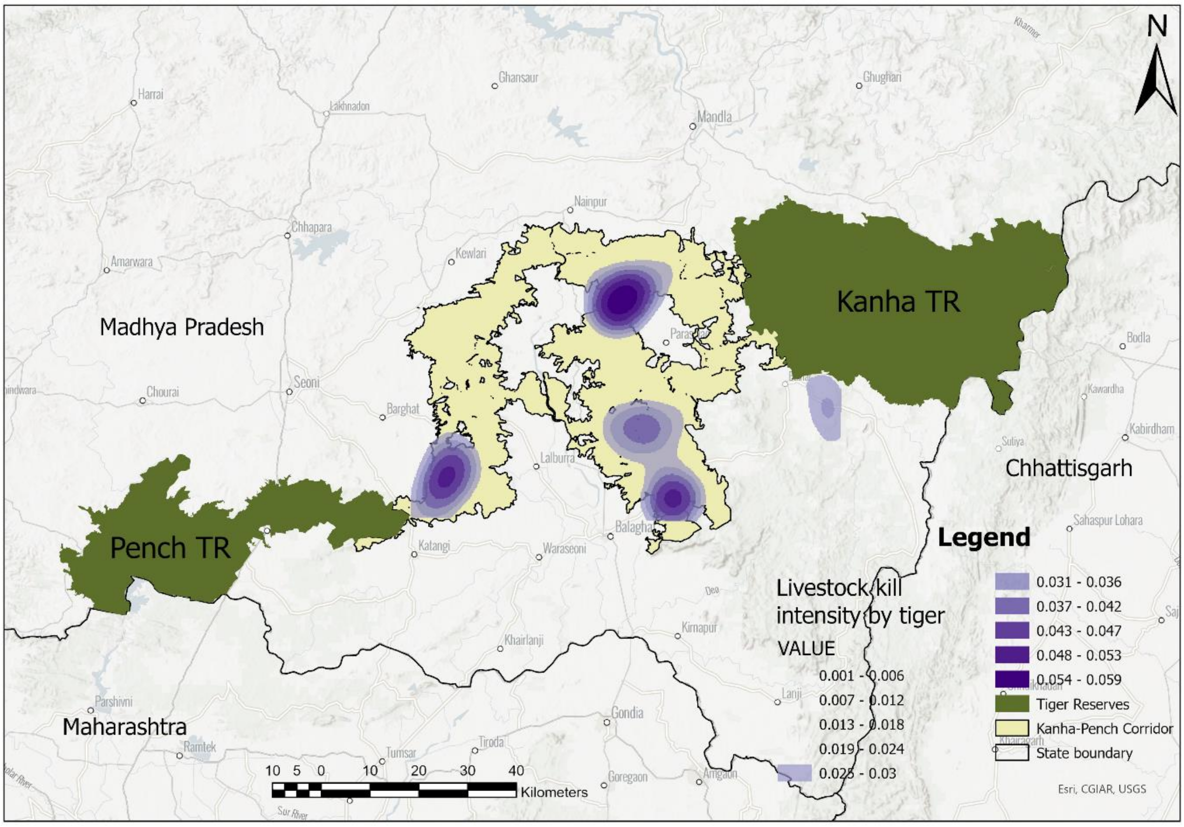
Supplementary Table 1

Pictorial representation of the medulla and cuticle patterns of each prey species identified in the tiger diet


N
Madhya Pradesh
Kanha Tiger Reserve
Pench Tiger Reserve
Chhattisgarh
Maharashtra
Legend
All tiger samples (N=146)
Kanha-Pench Corridor
Tiger Reserve
Indian state boundary
Kilometers
0 5 10 20 30 40 50


Cattle
Chital
Nilgai
Goat
Wild pig
Sambar
Striped hyena
Rufous-tailed hare
Northern plains langur
Rodents
Sloth bear
Indian grey mongoose
Gaur
Dog
Small Indian civet
Smooth-coated otter
Chousingha
Relative frequency of occurance (%)
0
10
20
30
40
Prey species


Index
1.0
0.5
0.0
-0.5
-1.0
Wild pig
Chital
Sambar
Nilgai
Cattle
Goat
Species


N
Madhya Pradesh
Kanha TR
Pench TR
Chhattisgarh
Maharashtra
Harrai
Lakhnadon
Ghansaur
Ghughari
Mandla
Nainpur
Chhapara
Kewlari
Amarwara
Chourai
Seoni
Barghat
Lalburra
Balaghat
Katangi
Waraseoni
Khairlanji
Kirnapur
Lanji
Gondia
Goregaon
Amgaon
Tirodi
Tumsar
Ramtek
Parshivni
Bodla
Kawardha
Kabirdham
Suliya
Sahaspur Lohara
Legend
Livestock kill intensity by tiger
VALUE
0.001 - 0.006
0.007 - 0.012
0.013 - 0.018
0.019 - 0.024
0.025 - 0.03
0.031 - 0.036
0.037 - 0.042
0.043 - 0.047
0.048 - 0.053
0.054 - 0.059
Tiger Reserves
Kanha-Pench Corridor
State boundary
10 5 0 10 20 30 40
Kilometers
Esri, CGIAR, USGS

Prey species	**Reference**	**Mean body weight (X) kg**	**Y=1.98+ 0.035X**	**Total sample**		
				% RFO	**Biomass (Y*RFO)**	**Relative biomass (%)**
Cattle (bull, cow, calf) (*Bos taurus*)	Biswas et al 2023	275	11.61	37.33	433.20	57.39
Chital (*Axis axis*)	Biswas et al 2023	50	3.73	12.33	45.99	6.09
Nilgai (*Boselaphus tragocamelus*)	Biswas et al 2023	181	8.32	11.64	96.82	12.83
Goat (*Capra aegagrus*)	Athreya et al 2014	25	2.86	10.27	29.33	3.89
Wild pig (*Sus scrofa*)	Sarkar et al 2018	70	4.43	8.90	39.45	5.23
Sambar (*Rusa unicolor*)	Biswas et al 2023	185	8.46	6.51	55.02	7.29
Striped hyena (*Hyaena hyaena*)	Menon 2014	41	3.42	2.05	7.02	0.93
Rufous-tailed hare (*Lepus nigricollis*)	Menon 2014	2.2	2.06	2.05	4.23	0.56
Northern plains langur (*Semnopithecus entellus*)	Menon 2014	11	2.37	1.71	4.05	0.54

Indian grey mongoose (*Herpestes edwardsii*)	Menon 2014	1.4	2.03	1.37	2.78	0.37
Rodents (*Rattus spp.*)	Sarkar et al 2018	0.5	2.00	1.37	2.74	0.36
Sloth bear (*Melursus ursinus*)	Menon 2014	95	5.31	1.37	7.27	0.96
Gaur (*Bos gaurus*)	Sarkar et al 2018	825	30.86	0.68	21.13	2.80
Dog (*Canis familiaris)*	Athreya et al 2014	18	2.61	0.68	1.79	0.24
Smooth-coated otter (*Lutrogale perspicillata*)	Menon 2014	11	2.37	0.68	1.62	0.21
Small Indian civet (*Viverricula indica*)	Menon 2014	4	2.12	0.68	1.45	0.19
Chousingha (*Tetracerus quadricornis*)	Menon 2014	25	2.86	0.34	0.98	0.13

Sl No	Range	Division	Hotspot
1	Lamta	Lamta Forest Development Corporation	1
2	Ukwa		
3	West Baihar	North Balaghat Forest Division	
4	South Lamta		2
5	Longur	South Balaghat Forest Division	
6	Balaghat		3
7	Lalburra		4
8	Katangi		
9	Waraseoni		
10	Behrai	Barghat Forest Development Corporation	

Sl No	**Literature**	**No of prey species found**	**Cattle (% RFO)**	**Buffalo (% RFO)**	**Goat (% RFO)**
1	Bagchi et al (2003)	8	2.89	2.60	-
2	Mondal et al (2007)	9	19.4	-	-
3	Andheria et al (2007)	12	0.45	-	-
4	Ramesh et al (2009)	11	2.12	1.06	-
5	Sarkar et al (2018)	14	20.63	-	26.59
6	Navaneethan et al (2019)	9	4.02	1.76	-
7	Biswas et al (2023)	11	9.54	-	-
8	Current study	17	37.33	-	10.27