THERYA, 2026, Vol. 17(1):99-110 DOI: 10.12933/therya.2026.6230 ISSN 2007-3364

Puma (*Puma concolor*) and bobcat (*Lynx rufus*) diet overlap in northern Chihuahua

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In carnivores, diet overlap is essential for understanding resource selection and competition in various environments. The objective of this study was to compare the diet composition and overlap between puma (*Puma concolor*) and bobcat (*Lynx rufus*) in northern Chihuahua. We expected greater overlap in disturbed environments. Puma and bobcat scats were collected from disturbed and non-disturbed environments in northern Chihuahua. Percentage of occurrence, dietary overlap, and differences in diet composition were calculated using Chi-square contingency tables. Twenty-three *Puma concolor* and 70 *Lynx rufus* scats were analyzed. The main prey consumed by both species were rodents, followed by lagomorphs. The consumption of plant materials, cattle, other carnivores, arthropods, and bats was observed. In disturbed environments, diet overlap was complete at two sites and partial at the other; in undisturbed sites, one site showed no overlap, and two showed partial overlap. Both felines share similar diets in disturbed areas, with substantial overlap in common prey such as lagomorphs and rodents. In undisturbed areas, their diets are more differentiated. In disturbed environments, their diets differed, and both species resorted to unusual sources (chiropterans, plant materials, and garbage). Therefore, in disturbed environments of the desert region of northern Chihuahua, changes in the diet of both felids occurred, along with increased competition for resources.

Key words: Competition; interspecific predation; percentage of occurrence; Pianka index; scat analysis; trophic plasticity.

La sobreposición de dieta entre carnívoros es clave para entender la selección y competencia por recursos en diversos ambientes. El objetivo fue comparar la composición y la sobreposición entre la dieta del puma (*Puma concolor*) y el gato montés (*Lynx rufus*) entre ambientes perturbados y no perturbados en el norte de Chihuahua. Se espera que la sobreposición sea mayor en ambientes perturbados. Se colectaron excretas de puma y gato montés en localidades perturbadas y no perturbadas del norte de Chihuahua. Se calculó el porcentaje de ocurrencia, la sobreposición de dieta y su diferencia por medio de tablas de contingencia de Chi-cuadrada. Se analizaron 23 excretas de puma y 70 de gato montés. Los roedores y lagomorfos fueron los principales alimentos de ambas especies. Destaca el consumo de materiales vegetales, ganado vacuno, otros carnívoros, artrópodos y murciélagos. En los ambientes perturbados la sobreposición de dieta fue completa en dos localidades y media en la otra, en cambio, en los no perturbados fue media en dos localidades y no hubo en la otra. Ambos felinos tienen dietas similares en los ambientes perturbados, con una sobreposición importante por lagomorfos y roedores. En los ambientes perturbados, sus dietas fueron diferentes, y ambas especies recurrieron a fuentes no comunes (quirópteros, materia vegetal y basura). Por lo tanto, en ambientes perturbados de la zona desértica del norte de Chihuahua se presentaron cambios en la dieta de ambos felinos y mayor competencia por los recursos.

Palabras clave: Análisis de excretas; competencia; depredación interespecífica; índice de Pianka; plasticidad trófica; porcentaje de ocurrencia.

The diet of carnivorous species is not only influenced by the abundance, composition, assemblage, energy requirements, and type of prey available, but also by environmental factors (Krebs *et al.* 1995; Carbone *et al.* 1999; Sinclair, 2003; Haswell *et al.* 2017), interspecific competition (Litvaitis and Harrison 1989; Hass 2009), and the hunting strategies of each species (Hernández 2015; Husseman *et al.* 2003). Dietary overlap between species is useful for assessing interactions by measuring the share or competition for food components (Elbroch and Kusler 2018).

The puma (*Puma concolor*) and the bobcat (*Lynx rufus*) coexist in North America from southwest Canada, in the region bordering the United States southward through the central part to the west coast and reaching northern and central Mexico (Koehler and Hornocker 1991; Hass 2009), with a 96 % geographical overlap in Mexico (Sánchez-Cordero *et al.* 2008). Both carnivores share prey, but differences in dietary preferences based on prey size, energy intake, and abundance influence the feeding patterns of each feline species (Hass, 2009).

Laundré *et al.* (2009) evaluated potential factors influencing puma abundance in the Chihuahuan Desert by comparing Sierra Rica and El Cuervo in Chihuahua. Sierra El Cuervo, with more inhabitants and easier access, showed a higher incidence of poaching, which could reduce prey abundance and, consequently, impact the puma population. Fischer *et al.* (2012) suggest that urbanization has altered trophic dynamics in McCormick County, South Carolina, by reducing top-down control (ecological control exercised by predators over lower trophic levels, regulating energy distribution) and increasing bottom-up control (control generated by energy and nutrient flow over the number of primary consumers and predators that the system can sustain) due to increased availability of food produced by man.

In the desert region of northern Chihuahua, pumas and bobcats interact despite increased productive activities and land-use changes associated with urban growth, as observed in other regions (Lewis *et al.* 2015; Parsons *et al.* 2019). Large-scale spatio-temporal analyses have revealed that in carnivores, habitat preference exerts a greater influence than interactions among them (Jensen *et al.* 2024; Suraci *et al.* 2025). In contrast, at local scales, evasion patterns are evident, as in the case of bobcats that avoid coyotes (*Canis latrans*), which in turn avoid bobcats and pumas (Jensen *et al.* 2024). The co-occurrence of bobcats with dominant carnivores such as pumas and wolves (*Canis lupus*) is negatively affected by factors associated with human activities; in contrast, its coexistence with two subordinate carnivores, the red fox (*Vulpes vulpes*) and the gray fox (*Urocyon cinereoargenteus*), depends mostly on environmental factors such as precipitation and gross primary production (Hubbard *et al.* 2022).

Studies on the puma diet report ungulates as the primary prey (Prude and Cain III 2021; Iacono *et al.* 2024; Bender *et al.* 2025); on the other hand, bobcats mainly prey on lagomorphs and rodents, with variable preference (Romero and Cervantes 2014; Sánchez-González *et al.* 2018; Draper *et al.* 2022). The diet overlap of bobcats and pumas ranges between 0.22 and 0.56 according to the Pianka index (Luna-Soria and López-González 2005; Hass 2009); between puma and jaguar, it ranges from 0.46 (Flores-Turdera *et al.* 2021) to 0.77 (Ávila-Nájera *et al.* 2018) and is greater than 90 % between bobcat and coyote (Martínez-García 2014; Witczuk *et al.* 2015). This raises the question of whether there are differences in the degree of diet overlap of two feline species in disturbed (P) versus undisturbed (NP) environments. The degree of overlap in disturbed environments is expected to be greater. Therefore, the objective of this study was to analyze the degree of diet overlap of two feline species in disturbed and undisturbed environments in northern Chihuahua.

Materials and methods

The study was conducted at eight locations in the municipalities of Ascension and Juárez, in northern Chihuahua. Disturbed environments (P) were defined as sites with human activities, such as agriculture, materials extraction, peri-urban areas, and the presence of garbage dumps, while undisturbed sites (NP) lacked these characteristics. P localities were West Sierra Juárez (WSJ), UACJ campus (CU), Rancho Arantxa (RA), and Sierra Presidio (SP); NPs were Rancho Blanco (RB) and Microondas Las Dunas Microwave Antennas (MWD), in Ascension; Rancho El Lobo (REL), and Southern Sierra Samalayuca (SSS; Figure 1). The dominant landscapes in all of them are microphyllous desert scrub and sandy deserts with stabilized dunes (INEGI 2021; León-Pesqueira *et al.* 2024).

Several field trips were carried out between May 2022 and July 2024. Cross-country transects measuring 2 to 4 km were established for scat collection, accounting for dirt roads, cattle and wildlife trails, latrines, and paths between hills. Scats were photographed *in situ*, placing a *vernier* caliper on one side. These were identified based on the criteria of Halfpenny and Biesiot (1986) and Aranda (2012). The characteristics used to identify puma scats were large size (20 to 30 cm long by 2 to 3.5 cm wide), cylindrical shape, presence of constrictions, and characteristic odor. The associated footprints measure 7 cm by 10 cm long, with round, teardrop-shaped toe pads, absence of claws, and metacarpal pads straight or concave on the front and with three lobes on the back. In the case of bobcats, scats are cylindrical, between 10 and 15 cm long and 1.5 to 2.5 cm wide, with marked constrictions and a characteristic odor that differentiates them from canid scat. The associated footprints measured between 4.5 and 5 cm long by 4 to 5 cm wide. Although scats were determined using the traditional approach, it should be noted that, ideally, genetic determination of predators is the most convenient method, as in the work of Torres-Romero *et al.* (2019). Scats were transferred to the Laboratory of Ecology and Animal Biodiversity (LEBA) of the UACJ, under the collection permits SGPA/DGVS/02524/22 and SPARN/DGVS/05498/23.

Scats were processed according to Ackerman *et al.* (1984). Vertebrate remains and hair were identified by comparison with voucher specimens deposited in the Scientific Collection of Vertebrates (CCV) of the UACJ (CHI-VER 189-0806). Arthropods were identified using the key of Eaton and Kaufman (2007), and plants were identified with expert assistance.

The percentage of occurrence (PO) of each food type for each predator was calculated in general and by locality (Sperry 1933; Alanis-Hernández *et al.* 2023). Only localities with scat data for both feline species were compared. The degree of overlap between environments and localities was determined using Pianka's index (Pianka, 1973), where values close to 0 indicate no overlap and 1 indicates total overlap of the diet (Krebs, 1999). Finally, the difference in diet composition between the two felines in both P and NP localities was evaluated using Chi-square contingency tables (Siegel and Castellan, 1988).

Results

A total of 23 scats of *Puma concolor* and 70 of *Lynx rufus* from eight sites were analyzed. Pumas living in P environments (*n* = 9) consumed 24 food items in five categories, with an average of 4.9 ± 2.0 per scat (Table 1). In NP environments (*n* = 14), they consumed 30 food items in three categories, with an average of 4.9 ± 1.9. Rodents had the highest PO (50 %) in both environments (P and NP), followed by lagomorphs (18.18 % and 19.10 %, respectively). Bobcats in P environments (*n* = 51) consumed 54 food items in six categories, with an average of 4.2 ± 1.5 per scat; mammals recorded the highest PO (73.14 %), mainly composed of

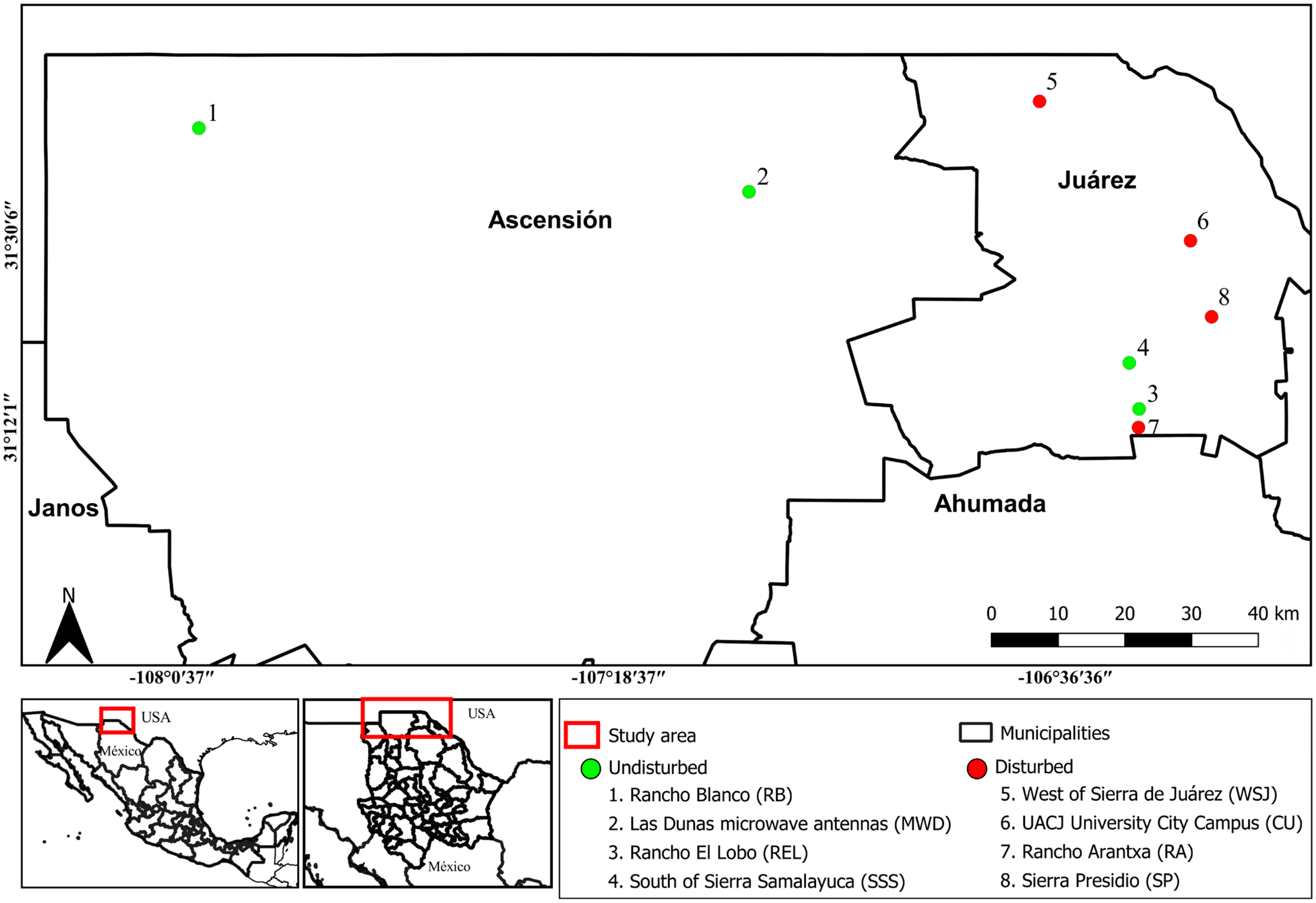

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Figure 1. Map of the localities sampled in northern Chihuahua.

rodents (55 %) and plant matter (14.36 %) (Figure 2). In NP environments (*n* = 19), they consumed 41 food items in five categories, with an average of 4.5 ± 2.0 (Figure 3). Mammals accounted for 79.8 % of the diet, with rodents being the most frequently consumed prey (60.7 %), followed by lagomorphs (13.5 %). This study documented puma consumption of wild ungulates in both environments. In NP, we reported consumption of pronghorn (*Antilocapra americana*) at one locality (MWD) and mule deer (*Odocoileus hemionus*) at two localities (SSS and REL). In P environments, mule deer consumption was recorded at one locality (CU); also, livestock consumption was higher in P localities. Equine consumption by pumas was documented at WSJ; in NP localities, cattle consumption by pumas was recorded in SSS. Bobcats fed on cattle, pigs, goats, and horses in WSJ, and pigs were consumed in CU. In NP localities, bobcats fed on cattle in MWD.

Both feline species preyed upon mesocarnivores. In P localities, pumas preyed on northern fox (*Vulpes macrotis*); in NP environments, they consumed northern fox, raccoon (*Procyon lotor*), and skunk (*Conepatus leuconotus* and *Mephithis mephitis*). For its part, bobcats inhabiting P environments consumed foxes (*Urocyon cinereoargenteus* and *V. macrotis)* and skunks (*M. macroura* and *C. leuconotus*); in NP, they preyed on northern fox and skunks (*M. mephitis* and *M. macroura*). Consumption of dog (*Canis lupus familiaris*) by puma in P environments was recorded in CU.

The consumption of uncommon food items was also documented in P environments, where the puma (RA and WSJ) and the bobcat (CU and RA) preyed on bats; pumas also preyed on them in an NP location (REL). Arthropods recorded a higher PO in bobcats than in pumas in both environments, with insects yielding the highest PO values. The consumption of birds and reptiles was low. As for plants, pumas and bobcats consumed grasses, mesquite, and cactus fruits and seeds in P environments; in NP, both consumed grass, mesquite, and walnut fruits and seeds of the genus *Carya*. Bobcats consumed unidentified plant materials in both environments. Garbage consumption was recorded in two P localities: CU (puma) and WSJ (bobcat). Garbage materials consumed included food packaging (aluminum and plastic) in both species and animal leather (shoe and bag remains) in bobcats.

In general, Pianka's index between P and NP environments showed high overlap values (0.71). As for the localities, P exhibited partial overlap (0.50) in OSJ and complete overlap (1.00) in CU and RA. NP localities showed partial overlap in REL (0.57) and SSS (0.61), and low overlap in MWD (0.03).

Table 1. Frequency of occurrence (FO) and percentage of occurrence (PO) of the diet of puma (*Puma concolor*) and bobcat (*Lynx rufus*) in northern Chihuahua, in disturbed (P) and undisturbed environments (NP).

	***Puma concolor* (n = 23)**				***Lynx rufus* (n = 70)**			
	P		**NP**		**P**		**NP**	
Category/Components	FO	PO	FO	PO	FO	PO	FO	PO
Phylum Arthropoda								
Insects	0	0	0	0	1.96	0.46	5.26	1.12
Coleoptera	0	0	0	0	17.65	4.17	10.53	2.25
Cerambycidae	11.11	2.27	0	0	0	0	0.00	0.00
Orthopthera	0	0	0	0	5.88	1.39	0.00	0.00
Solifugae	0	0	0	0	0	0	5.26	1.12
Class Reptilia								
Unidentified reptiles	0	0	7.14	1.47	11.76	2.78	10.53	2.25
Sauria	0	0	0	0	1.96	0.46	5.26	1.12
Colubridae	0	0	0	0	0	0	5.26	1.12
Crotalus sp.	0	0	0	0	1.96	0.46	0.00	0.00
Class Aves								
Unidentified birds	11.11	2.27	0	0	3.92	0.93	10.53	2.25
Class Mammalia								
Antrozous pallidus	0	0	14.29	2.94	0	0	0.00	0.00
Tadarida brasiliensis	0	0	0	0	1.96	0.46	0.00	0.00
Myotis yumanensis	11.11	2.27	0	0	1.96	0.46	0.00	0.00
Eptesicus fuscus	11.11	2.27	7.14	1.47	0.00	0.00	0.00	0.00
Notiosorex crawfordii	0	0	0	0	1.96	0.46	0.00	0.00
Canis lupus familiaris	11.11	2.27	0	0	0.00	0.00	0.00	0.00
Urocyon cinereoargenteus	0	0	0	0	1.96	0.46	0.00	0.00
Vulpes macrotis	22.22	4.55	7.14	1.47	5.88	1.39	5.26	1.12
Procyon lotor	0	0	7.14	1.47	0.00	0.00	5.26	1.12
Taxidea taxus	0	0	0	0	1.96	0.46	0.00	0.00
Mephitis macroura	0	0	0	0	5.88	1.39	5.26	1.12
Mephitis mephitis	0	0	7.14	1.47	0.00	0.00	5.26	1.12
Conephatus leuconotus	0	0	7.14	1.47	1.96	0.46	0.00	0.00
Antilocapra americana	0	0	7.14	1.47	0.00	0.00	0.00	0.00
Odocoileus hemionus	11.11	2.27	28.58	5.89	0.00	0.00	0.00	0.00
Sus scrofa	0	0	0	0	7.84	1.85	0.00	0.00
Bos taurus	0	0	14.29	2.94	3.92	0.93	5.26	1.12
Capra aegagrus hircus	0	0	0	0	3.92	0.93	0.00	0.00
Equus caballus	33.33	6.82	0	0	5.88	1.39	0.00	0.00
Cratogeomys castanops	0	0	0	0	1.96	0.46	0.00	0.00
Geomys arenarius	0	0	7.14	1.47	1.96	0.46	0.00	0.00
Dipodomys merriami	33.33	6.82	28.58	5.89	31.37	7.41	52.63	11.24
Dipodomys ordii	33.33	6.82	14.29	2.94	17.65	4.17	15.79	3.37
Dipodomys spectabilis	0	0	0	0	7.84	1.85	5.26	1.12
Chaetodipus baileyi	0	0	0	0	1.96	0.46	5.26	1.12
Chaetodipus eremicus	33.33	6.82	35.71	7.35	9.80	2.31	10.53	2.25

Chaetodipus hispidus	0	0	0	0	5.88	1.39	5.26	1.12
Chaetodipus intermedius	0	0	14.29	2.94	15.69	3.70	15.79	3.37
Perognathus flavescens	0	0	0	0	0.00	0.00	5.26	1.12
Perognathus flavus	0	0	0	0	1.96	0.46	10.53	2.25
Perognathus merriami	0	0	7.14	1.47	1.96	0.46	5.26	1.12
Neotoma albigula	55.56	11.36	50	10.29	43.14	10.18	31.58	6.74
Neotoma mexicana	0	0	0	0	1.96	0.46	0.00	0.00
Neotoma micropus	0	0	0	0	7.84	1.85	5.26	1.12
Onychomys arenicola	0	0	0	0	3.92	0.93	5.26	1.12
Onychomys leucogaster	0	0	0	0	1.96	0.46	10.53	2.25
Peromyscus difficilis	0	0	0	0	3.92	0.93	0.00	0.00
Peromyscus eremicus	33.33	6.82	21.43	4.41	9.8	2.31	10.53	2.25
Peromyscus leucopus	0	0	0	0	3.92	0.93	0.00	0.00
Peromyscus maniculatus	11.11	2.27	28.58	5.89	27.45	6.48	26.32	5.62
Peromyscus truei	0	0	0	0	1.96	0.46	5.26	1.12
Reithrodontomys fulvescens	0	0	7.14	1.47	7.84	1.85	15.79	3.37
Reithrodontomys megalotis	11.11	2.27	7.14	1.47	1.96	0.46	0.00	0.00
Reithrodontomys montanus	0	0	0	0	0	0	5.26	1.12
Sigmodon fulviventer	0	0	0	0	1.96	0.46	5.26	1.12
Sigmodon hispidus	0	0	0	0	3.92	0.93	10.53	2.25
Sigmodon ochrognathus	0	0	0	0	1.96	0.46	0	0
Ammospermophilus interpres	11.11	2.27	7.14	1.47	0	0	0	0
Otospermophilus variegatus	11.11	2.27	7.14	1.47	3.92	0.93	10.53	2.25
Xerospermophilus spilosoma	11.11	2.27	7.14	1.47	7.84	1.85	10.53	2.25
Lepus californicus	44.44	9.09	57.14	11.77	11.76	2.78	36.84	7.87
Sylvilagus audubonii	44.44	9.09	35.71	7.35	19.61	4.63	26.32	5.62
Plant materials								
Unidentified plant material	0	0	0	0	23.53	5.56	10.53	2.25
Neltuma glandulosa	11.11	2.27	14.29	2.94	23.53	5.56	21.05	4.49
Poaceae	11.11	2.27	14.29	2.94	9.8	2.31	5.26	1.12
Cactaceae	0.93	0.03	0	0	3.92	0.93	0	0
Carya illinoinensis	0	0	7.14	1.47	0	0	5.26	1.12
Yucca sp.	0	0	7.14	1.47	0	0	0	0
Garbage								
Garbage	11.11	2.27	0	0	7.84	1.85	0	0
Total	489.78	100	485.71	100	423.49	100	468.42	100

Regarding the difference in diet composition between puma and bobcat by locality using the Chi square method, P environments showed a significant difference between the diets of both felines ($X^2 = 8.18$, d.f. = 1, $p = 0.004$), but not in NP localities ($X^2 = 1.13$, d. f = 1, $p = 0.288$). In these environments, significant differences were observed in WSJ ($X^2 = 12.19$, d.f. = 1, $p = 0.0005$), but not in RA ($X^2 = 0.37$, d.f. = 1, $p = 0.542$) and CU ($X^2 = 2.28$, d.f. = 1, $p = 0.132$). In NP environments, no differences were observed in MWD ($X^2 = 1.22$, d.f. = 1, $p.$ = 0.269) and SSS ($X^2 = 0.79$, d.f. = 1, $p = 0.3751$), and a moderate difference was recorded in REL ($X^2 = 3.67$, d.f. = 1, $p = 0.055$).

Discussion

In both environments (P and NP), bobcats mainly preyed on rodents, while pumas mainly consumed rodents and lagomorphs. It is known that bobcats prefer lagomorphs and rodents (Leopold and Krausman 1986; Delibes and Hiraldo, 1987; Hass, 2009; López-Vidal *et al.* 2014; Romero and Cervantes 2014; Sánchez-González *et al.* 2018; Draper *et al.* 2022). On the other hand, it has been documented that pumas consume more ungulates in North America (Iriarte *et al.* 1990; Pierce *et al.* 2000; De la Torre and De la Riva 2009; Hass, 2009). Mule deer (*Odocoileus hemionus*)

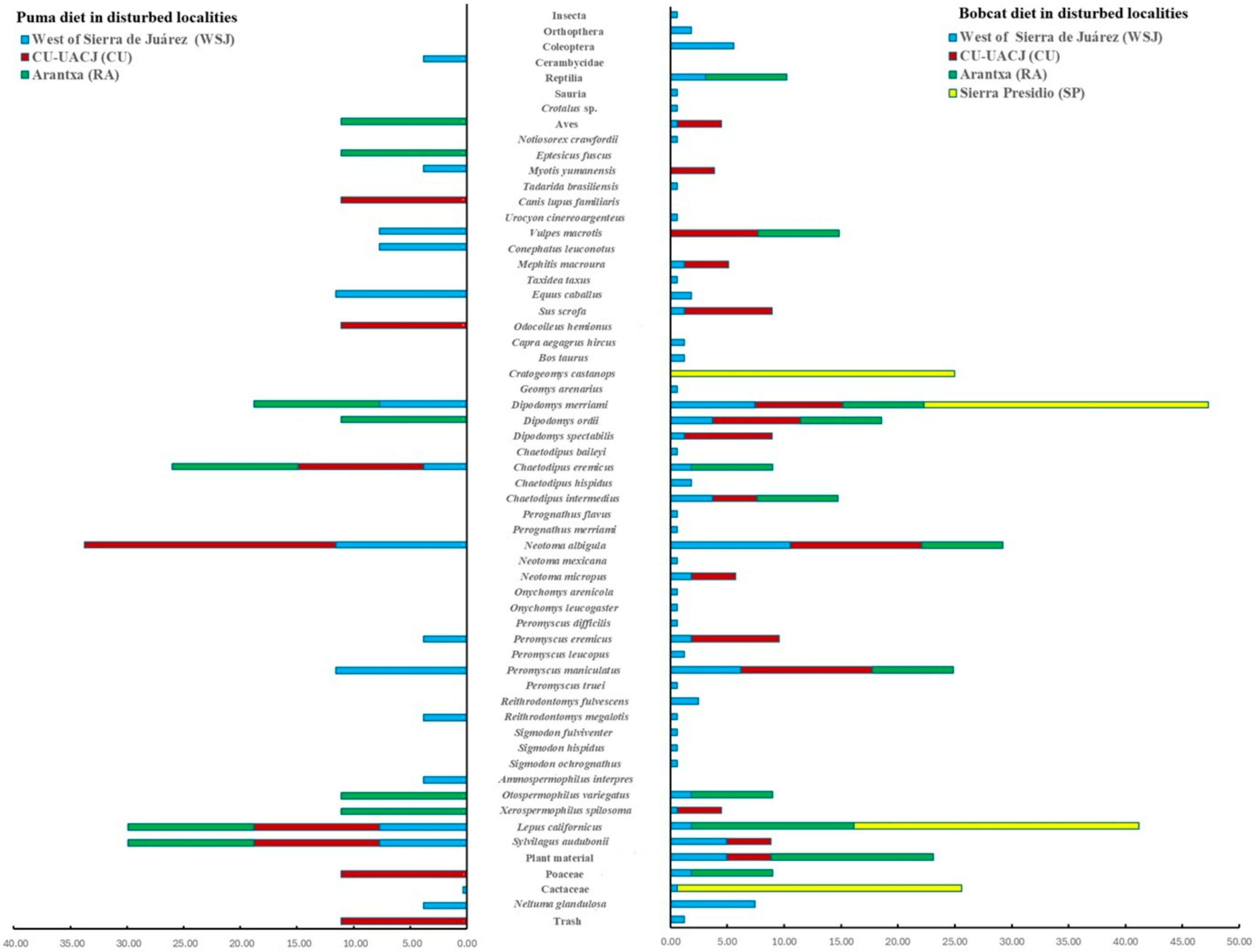

Figure 2. Percentage of occurrence of prey in the diet of puma (*Puma concolor*) and bobcat (*Lynx rufus*) in disturbed localities (P) in northern Chihuahua.

is the most consumed prey type by pumas in desert areas (Leopold and Krausman, 1986; Koehler and Hornocker, 1991; Cunningham *et al.* 1999; Logan and Sweanor, 2001; Prude and Cain III, 2021), although when its availability is low, the consumption of smaller prey increases by up to 50 %, consistent with the results of the present study. This finding confirms the plasticity of the puma diet and reaffirms its ability to persist in environments where its main prey decreases or is harder to capture, so its consumption becomes energetically non-profitable, as the cost and risk associated with its search and capture outweigh the benefits obtained (Leopold and Krausman 1986; Yañez *et al.* 1986; Iriarte *et al.* 1991; Donadio *et al.* 2010; Villepique *et al.* 2011; Pia 2013; Bender *et al.* 2025).

Regarding pronghorn consumption, there are no records of this species in the MWD area, so it is necessary to determine whether there are nearby populations. Distribution areas have been documented in the southwestern part of the municipality of Ascensión (Carreón-Hernández and Lafón-Terrazas 2014), 100 km from MWD. It has been reported that seasonal puma activity areas can be greater than 100 km^2 (Dellinger *et al.* 2018), so pumas may consume pronghorn in that area and leave evidence in MWD. Bernard *et al.* (2023) reported pronghorn consumption in northern New Mexico, which they considered infrequent. As for the consumption of cattle and domestic animals, we found evidence of puma having low consumption of horses in P environments and cattle in NP localities, as previously reported for the species (Ackerman *et al.* 1984; Luna-Soria and López-González, 2005; Rosas-Rosas *et al.* 2008; De la Torre and De la Riva 2009; Amador-Alcalá *et al.* 2013; Peña-Mondragón and Castillo 2013; Palmeira *et al.* 2015; Cassaigne *et al.* 2016; Prude and Cain III 2021; Guerisoli *et al.* 2021; Mesler and Jones 2022; Iacono *et al.* 2024; Racero-Casarrubia *et al.* 2024). Cattle, pig, goat, and horse consumption by bobcats is similar to that previously reported, being low relative to other food components (Aranda *et al.* 2002; Peña-Mondragón and Castillo 2013; Prude and Cain III 2021).

Predation of mesocarnivores by both felines was common. The species consumed were similar to those reported by Hass (2009) and Prude and Cain III (2021), who recorded seven and 11 carnivores in the puma diet,

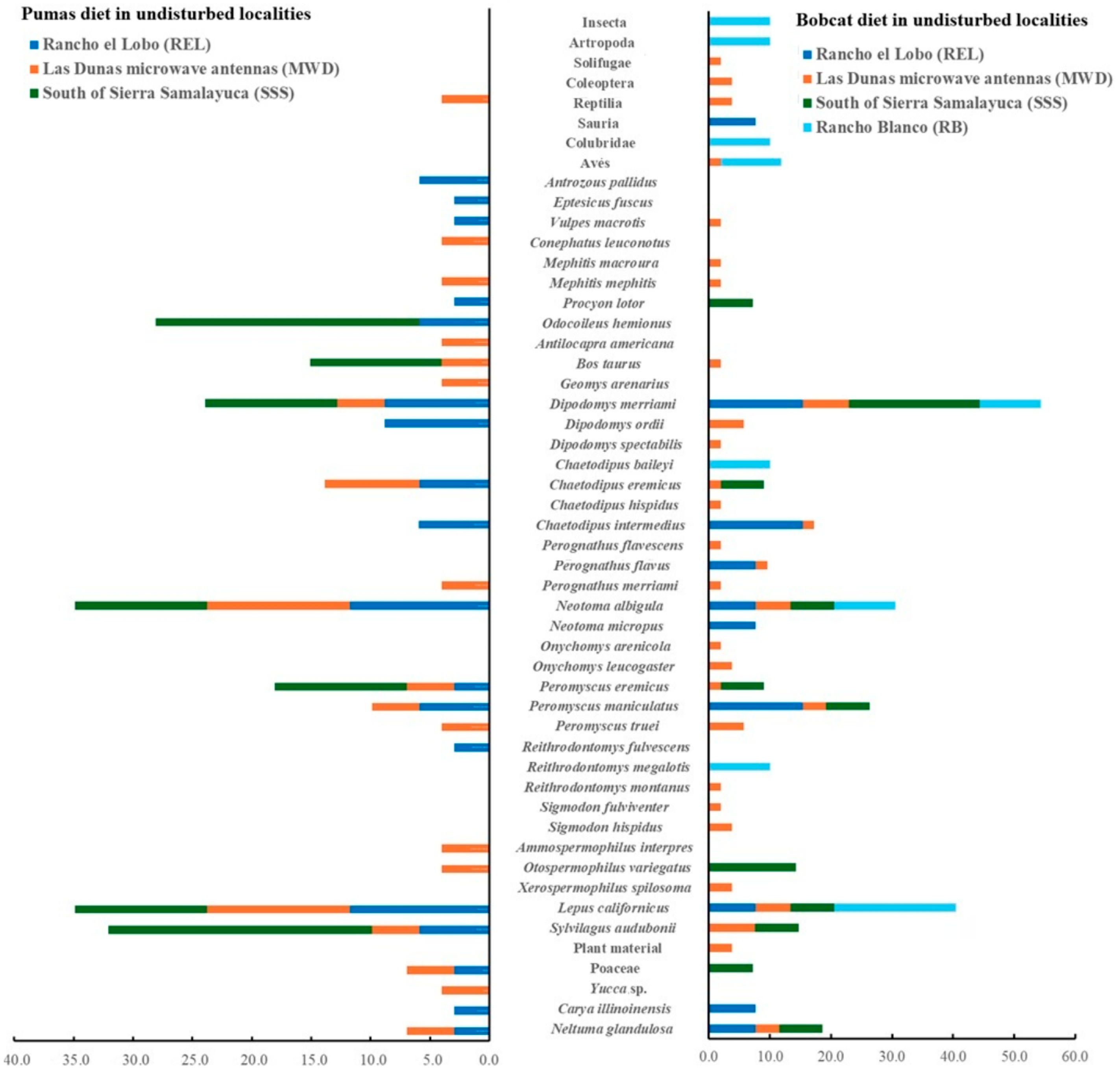

Figure 3. Percentage of prey occurrence in the diet of puma (*Puma concolor*) and bobcat (*Lynx rufus*) in undisturbed localities (NP) in northern Chihuahua.

respectively. Bobcat is known to have consumed gray fox and skunks (Hamilton and Hunter 1939; Litvaitis *et al.* 1981; Story *et al.* 1982; Trevor *et al.* 1989; Fedriani *et al.* 2000; Farias *et al.* 2005; Hass 2009; Draper *et al.* 2022; Landry *et al.* 2022). We found no studies reporting bobcat consumption of northern foxes or tlalcoyotes (*Taxidea taxus*). In addition, puma consumption of dogs (*Canis lupus familiaris*) in a P environment was recorded in CU. It has been reported that pumas commonly hunt dogs (Mazzolli, 2009; Buttler *et al.* 2014) and occasionally consume them (Farrell *et al.* 2000; Leberg *et al.* 2004; Villepique *et al.* 2011; Prude and Cain III 2021, Racero-Casarrubia *et al.* 2024). In Arizona, Wroe and Wroe (1982) reported bats preyed upon by bobcats. As for puma, only the presence of a non-identified bat has been reported in puma scats collected at Manu National Park, Peru (Emmons 1987). We found no reports of pumas hunting bats in North America, which is notable given the rarity of this prey, characterized by low energy value and great difficulty of capture due to its size and behavior. This occasional consumption suggests a high degree of opportunism and trophic plasticity in pumas, particularly in disturbed or ecologically changing environments, where traditional resources may be limited. Regarding plant materials, several authors mention that felines do not consume plants because they are obligate carnivores (Morris *et al.* 2002; Sanquist and Sanquist 2002; Verbrugghe and Hesta 2017), since, despite their being present, they are not considered typical components in the diet of this group, so they have not been described or quantified. However, the opposite has been the subject of recent discussions (Yoshimura *et al.* 2020; Yoshimura *et al.* 2021). For example, Yoshimura *et al.* (2021) mention that in 361 studies of feline diet, only 37 % mention the frequency of occurrence of plant materials, and 7.3 % simply report plant material. Few studies include plant materials in the diet composition (Ackerman *et al.* 1986; Rocha-Mendes *et al.* 2010; Montalvo *et al.* 2020), and grasses (Ackerman *et al.* 1986; Gómez-Ortiz *et al.* 2011; Villepique *et al.* 2011; Franck and Farid 2020) consumed by pumas. For bobcat, several authors report the use of plant material, mainly grasses, mesquite fruits, *Yucca,* and cacti in desert environments (Litvaitis and Harrison 1989; Mckinney and Smith 2007; López-Vidal *et al.* 2014). The presence of pecan nuts (*Carya illinoinensis*) in feline scat in NP environments is associated with nearby farms cultivating this crop, a growing agricultural activity that is transforming the Chihuahuan desert. It is suspected that fiber-rich plant materials (unidentified plant material and grasses) were consumed seeking to improve digestion or excrete parasites (Yoshimura *et al.* 2021), while the consumption of fruits (cactus seeds, mesquite *Neltuma* sp., *Yucca* sp., and *Carya*) was due to diploendozoochory, a phenomenon that has been observed in both bobcats (Rubalcava-Castillo *et al.* 2021) and pumas (Sarasola *et al.* 2016).

Insects, reptiles, and birds have been documented in the bobcat diet in Mapimí (López-Vidal *et al.*, 2014), with insects at a lower percentage than that recorded in the present study. The puma consumed birds in NP environments, as previously documented (Prude and Cain III 2021). The presence of garbage in feline scat has been documented in P environments. In these areas, where the natural habitat of wild felines is altered by urban expansion, felines may lose their territories and be forced to adapt to anthropic environments (Bateman and Fleming 2012; Robins *et al.* 2019; Bartolucci *et al.* 2020; Riley *et al.* 2021), such as clandestine or unregulated garbage dumps, which are common in these areas. Under such conditions, these felines may resort to alternative food sources, including food scraps, garbage, and other anthropogenic wastes (Baruch-Moro *et al.* 2014; Plaza and Lambertucci 2017; Handler *et al.* 2020; Larson *et al.* 2020). Although garbage and anthropogenic organic waste are not commonly consumed by wild felines (Riley *et al.* 2021), human pressures and environmental pollution can increase the probability of felines encountering these wastes. Plastic consumption by puma is similar to that reported by Bartolucci *et al.* (2020), who identified two types of polyethylene. The consumption of garbage and human waste could harm the health of wild species, as it has been shown to affect domestic animals (Jensen and Nolte 2008; Prabhakar *et al.* 2012; Paraš *et al.* 2017).

A high dietary overlap was observed between bobcats and pumas in both environments, according to the Pianka index, indicating that both species share a large number of prey species. In P localities (CU and RA), both felines occupy nearly identical food niches, indicating high competition in these environments. In contrast, food overlap in NP localities was either low (MWD) or moderate (REL and SSS), suggesting that the species occupy very different niches, possibly due to differences in available resources or ecological strategies, which could indicate greater specialization or ecological segregation. This finding is similar to that observed by Hass (2009) in Tucson, Arizona, where an intermediate level of diet overlap between pumas and lynxes was reported. The observations in both studies are consistent with the idea that competition between species varies with regional ecological conditions and resource availability, which favors less competition between the two species and results in less overlap in their diets. The compositional difference analysis revealed that the diets of puma and bobcat are similar in P environments, possibly because environmental disturbances affect prey availability and force both feline species to consume resources not commonly observed in studies of diets in undisturbed environments. In contrast, in NP localities, the diets of puma and bobcat were different. It is likely that, in NP environments, each species has access to more varied and specific food resources, leading to differences in their feeding habits (Foster *et al.* 2010; Khorozyan *et al.* 2015; Ferretti *et al.* 2020). Therefore, studies examining predator and prey diets and abundances are necessary to evaluate the importance and interactions among the mechanisms that may be shaping trophic dynamics in urban and suburban areas (Fischer *et al.*, 2012).

In conclusion, prey consumption by bobcats and pumas differs between undisturbed and disturbed environments. There is substantial overlap in the diets of puma and bobcat in disturbed environments of northern Chihuahua, with greater consumption of common prey such as lagomorphs and rodents, highlighting competition between these felines. Competition for resources in areas near human settlements forces these felines to resort to unconventional food sources, such as garbage and plant materials. The findings in the present study underscore the importance of considering ecological interactions and the impact of habitat alteration on the diet and behavior of felines in desert environments.

Acknowledgments

To SEMARNAT for the collection permit SGPA/DGVS/02524/22. To the individuals who granted access for sample collection. To C. Muñoz Rivas, S. Ramos Guerra, D. Chávez, and E. Carrejo for their support during fieldwork, and to A. Zapata, P. Osorio, S. Vásquez, and K. Esparza for their assistance with sample processing. To Laura de León Pesqueira and Juan Rolando Rueda for their botanical support. We also thank the reviewers of this manuscript for their corrections and comments.

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Associated editor: Alina Gabriela Monroy-Gamboa
Submitted: September 4, 2025
Reviewed: December 15, 2025
Accepted: January 9, 2026
Published on line: January 30, 2026