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Article

TROPHIC ECOLOGY OF GEOFFROY'S CAT (*Leopardus geoffroyi*) AND MAMMAL PREY AVAILABILITY IN SEMI-ARID ENVIRONMENTS OF CENTRAL PATAGONIA, ARGENTINA

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ABSTRACT. Research on the dietary composition of felids can help improve the perception of rural workers and their tolerance towards this group, which is threatened by human-wildlife conflicts. In this context, the purpose of this study was to quantify the diet of *Leopardus geoffroyi* in Península Valdés (Patagonia, Argentina) to obtain baseline knowledge of the species dietary habits, trophic ecology, and degree of prey consumption. To this end, 160 fresh scat samples, collected from 2013 to 2016, were analyzed. Ten mammal species, one tinamou bird, one lizard genus, and one insect order were identified. The most frequently consumed prey (63.84%) were small-sized mammals (< 1 kg), accounting for the highest biomass contribution (37.2%). The frequency of each mammal species in the diet was not correlated with their capture frequency (measured through Sherman live traps and pedestrian diurnal transects). This study is the first to report on the diet of *L. geoffroyi* in Argentinean central Patagonia, and it provides information not only on ecological aspects but also on the natural history of this felid species.

RESUMEN. ECOLOGÍA TRÓFICA DEL GATO MONTÉS (*Leopardus geoffroyi*) Y DISPONIBILIDAD DE PRESAS DE MAMÍFEROS EN AMBIENTES SEMIÁRIDOS DE LA PATAGONIA CENTRAL, ARGENTINA. La investigación sobre la composición de la dieta de los felinos puede ayudar a mejorar la percepción y la tolerancia de los trabajadores rurales hacia esta especie de carnívoro felino que se ve amenazada por el conflicto entre humano-vida silvestre. En este contexto, el propósito de este estudio fue cuantificar la dieta de *Leopardus geoffroyi* en Península Valdés (Patagonia, Argentina) con la finalidad de obtener un conocimiento básico sobre la ecología trófica y el grado de consumo de presas. Para ello, se analizaron 160 muestras de heces frescas recogidas entre 2013 y 2016. Se identificaron 10 especies de mamíferos, una especie de tinamú, un género de lagarto y un orden de insecto. Se encontró que las presas consumidas con mayor frecuencia (63.84%) eran los mamíferos de pequeño tamaño (< 1 kg) que, a su vez, representaron la mayor contribución de biomasa (37.2%). La frecuencia de cada especie de mamífero en la dieta no se correlacionó con su frecuencia de captura (medida a través de trampas de captura viva tipo Sherman y transectos diurnos pedestres). Este trabajo es la primera aproximación a la dieta de *L. geoffroyi* realizada en la Patagonia central argentina y aporta conocimientos no solo sobre aspectos ecológicos, sino también sobre la historia natural de esta especie de felino.

Key words: *Carnivora*, diet, Felidae, Península Valdés, scat analysis.

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Palabras clave: análisis de heces, *Carnivora*, dieta, Felidae, Península Valdés.

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INTRODUCTION

Habitat degradation and land-use changes are the main reasons for global biodiversity loss (Pereira et al. 2010), with livestock activity accounting for 30% of these losses (Baur & Stone 2015). In parallel, poaching, another important threat resulting from human-wildlife conflict, extirpates species and, therefore, affects biodiversity (Ervin 2003). In this context, wild cats are likely to be harmed by these threats within their distribution areas, and this, in turn, affects their survival either at regional or local scales (Inskip & Zimmermann 2009; Bangs & Shivik 2001; Altrichter et al. 2006; Snow 2008; Anderson et al. 2010).

The Geoffroy's cat, *Leopardus geoffroyi* (D'Orbigny & Gervais, 1844), is distributed over a large portion of South America, which extends from southern Bolivia and Paraná basin of southern Brazil to the southern end of Argentinean Patagonia (Pereira et al. 2012, 2019; Sunquist & Sunquist 2009; Ximénez 1975). This small felid (c. 4 kg) lives in a varied range of habitats, such as grasslands, xerophytic forests, shrublands, and savannas (Pereira et al. 2012; Perovic & Pereira 2006; Ximénez 1975), and it is considered an opportunistic predator that feeds primarily on small rodents, lagomorphs, birds, and livestock (Bisceglia et al. 2008; Canepuccia et al. 2007; Guidobono et al. 2016; Johnson & Franklin 1991; Manfredi et al. 2004; Novaro et al. 2000; Palacios et al. 2012; Pereira et al. 2006; Sousa & Bager 2008; Sunquist & Sunquist 2002).

Little is known about the ecology of Geoffroy's cat in Patagonia. To date, only a few studies have provided input on its habitat preferences, activity pattern, food habits, and threats (see D'Agostino & Udrizar Sauthier 2020; Gantchoff & Belant 2016; Johnson & Franklin 1991; Lantschner et al. 2012; Nabte 2010; Novaro et al. 2000; Palacios et al. 2012). In the vast Patagonia region, which extends along more than 1 000 000 km^2, only three studies have been conducted to date on the diet of Geoffroy's cat. Two were performed in northern Patagonia (Novaro et al. 2000; Palacios et al. 2012), and the other one in its southern portion (Johnson & Franklin 1991). For central Argentinean Patagonia, which corresponds to the province of Chubut, a territory of 224 686 km^2 (larger than Great Britain), no studies on the diet of this felid have been performed to date. Therefore, the objectives of the present study were: 1- to quantify the diet of the Geoffroy's cat to determine the availability of small and medium-sized mammals in natural environments in the Argentinean central Patagonia; 2- to elucidate if there is a relationship between prey consumption and availability, and 3- determine if there are differences between the prey items found in latrines of the Geoffroy's cat, both annually and seasonally.

MATERIALS AND METHODS

Study area

This study was conducted in the San Pablo de Valdés Wildlife Reserve (SPVR, 42°36'–42°43' S and 64°10'–64°15' W), which is located in the Península Valdés (PV; province of Chubut, Argentina; **Fig**. 1). PV is one of the most important conservation areas in Patagonia as a result of the richness of its marine fauna and the natural and scenic value of its environment and continental fauna. In 1999, PV was declared a Natural Heritage Site by UNESCO, and Biosphere Reserve in 2014. According to the classification of protected areas by the International Union for the Conservation of Nature (IUCN), PV has been classified under category VI, that is, a protected area of managed resources (Phillips 2002). The climate is semi-arid and marine-influenced, with precipitation periods that concentrate mostly in autumn and winter, and the annual precipitation average is 232 mm (Frumento 2017). From a phytogeographical point of view, PV is considered an ecotone between Monte and Patagónica phytogeographical provinces, the two main units of extra-andean Patagonia (León et al. 1998; Oyarzabal et al. 2018).

SPVR is located in the southwestern sector of PV and covers a total area of 7.360 ha (**Fig**. 1). It was colonized by cattle ranchers in 1913 and by 1950, it had 3.500 sheep individuals. Towards the end of 2005, sheep and internal wire fences were removed, and SPVR started to be dedicated to wildlife conservation (Arias et al. 2017). The surrounding ranches continued to be, and still are, dedicated to sheep rearing as the main economic activity.

SPVR contains the following six main plant communities (PCs; Pazos et al. 2017; **Fig**. 1): PC1, medium shrub-steppe dominated by *Chuquiraga avellanedae*, *Lycium ameghinoi*, *Schinus johnstonii*, *Menodora robusta*, and *Acantholippia seriphioides*; PC2, shrub-grass steppe dominated by *C. avellanedae*, *Nassella tenuis*, *Poa lanuginosa*, and *Piptochaetium napostaense*; PC3, high shrub-grass steppe dominated by *C. erinacea hystrix*, *C. avellanedae*, *A. seriphioides*, *N. tenuis*, *P. napostaense*, and *Pappostipa speciosa*; PC4, dwarf shrub-grass steppe dominated by *Hyalis argentea*, *N. tenuis*, and

P. lanuginosa; PC5, grass steppe dominated by *Sporobolus rigens*, *P. lanuginosa*, and *N. tenuis*; and PC6, grass-shrub steppe dominated by *S. rigens*, *N. tenuis*, and *P. napostaense*.

Diet analysis

The Geoffroy's cat prey items were determined by analyzing 160 fresh scat samples collected from 2013 to 2016 (**Fig**. 1), following the methods proposed by Reynolds & Aebischer (1991). The three latrines regularly used by the species were first identified by direct observation, then we installed a camera trap in each one to identify the visiting species and their temporal activity patterns (Bisceglia et al. 2008; Manfredi et al. 2006; Soler et al. 2009). Scats were subsequently collected from these latrines.

Once at the laboratory, bones, teeth, hairs, feathers, scales, and arthropod remains were separated. The items consumed by Geoffroy's cat were identified by examining them under a ZEISS Stemi SV6 stereoscopic microscope. Vertebrate and arthropod remains were identified to the lowest taxonomic level possible by comparing them with materials housed in the *Colección Ecológica de Vertebrados de Ecosistemas Continentales* (CEVEC) and the *Colección Entomológica* of the *Instituto Patagónico para el Estudio de los Ecosistemas Continentales* (IPEEC-CONICET), both located in the city of Puerto Madryn, Argentina. Taxonomic identifications were also made with the assistance of specialists and following related literature (e.g., Udrizar Sauthier et al. 2020; Johnson & Triplehorn 2005).

For the quantification of the vertebrates consumed, and to avoid overestimations, the laterality of the bone and dental remains found was taken into account (Grayson 1984). All the data collected were analyzed as frequency percentages, that is, the total frequency of a prey item divided by the sum of all frequencies (Cavallini & Lovari 1991). The percentage of biomass contribution to the diet of Geoffroy's cat was estimated by multiplying the number of prey individuals in the scats by the mean body mass of each prey species (Napolitano et al. 2008). For the calculations, the average prey body mass was taken from the CEVEC database and related literature (Baldone et al. 2009; Campos et al. 2001; Chebez et al. 2014; Minoli et al. 2010; Superina & Abba 2014). A correction factor was used for biomass calculation to correct the underrepresentation of large prey (> 2 kg) in the scats (Y = 1.98 + 0.035 * P; P is average prey weight; Ackerman et al. 1984). The values corresponding to prey with body mass below 2 kg were not corrected under the assumption that they were eaten whole (Ackerman et al. 1984). Prey items found in latrines were compared annually and seasonally using the Kruskal-Wallis H test. R Statistical software (R Core Team 2018) was used for statistical analyses.

Potential prey items in the field

We estimated capture frequency and record frequency as indicators of the availability of mammal prey in the areas close to the latrines used by Geoffroy's cat concomitantly to scat collection. The capture frequency of small-sized mammals was determined by capture-recapture methods. In each PC, we placed two transects (separated by 300 m) with 35 Sherman live traps each (350 traps in total). PC2 and PC6 were considered as only one PC due to their reduced size (**Fig**. 1). Traps were located 10 meters apart from each other and were active for four consecutive nights. Rolled oats and vanilla essence were used as bait in Sherman traps to capture small-sized mammals. The animals captured were identified, sexed, weighed, marked, and released at the capture site. Trap sampling was carried out seasonally from 2013 to 2016, with a sampling effort of 18.200 traps/night. The relative abundance of each species was estimated per PC as the percentage of the total number of captures (Zapata et al. 2017). Small mammal capture permits were issued by the *Dirección de Flora y Fauna Nativa* of the province of Chubut, Argentina (Permit Number 37/2013). Animal management in the field was performed following the procedures outlined by the American Society of Mammalogists (Sikes et al. 2011).

Data on medium-sized mammals were obtained from pedestrian diurnal transect surveys. Two transects (3 km each) were made seasonally in each PC between 2013 and 2016 (**Fig**. 1), totaling 480 km traversed. Sightings of individuals, tracks, burrows, dead animals, and scats were recorded in every transect. The number of mammal records per kilometer walked was used to calculate record frequency (Carrillo et al. 2000; Reyna-Hurtado & Tanner 2005).

To compare prey consumption and availability, the frequency of scats containing individuals of each prey mammal species was correlated with the capture frequency and record frequency of each species using Spearman's rank correlation (Zar 1984). A significance level of $\propto$=0.05 was used for all statistical tests conducted in this study.

RESULTS

A total of 83 individuals belonging to 18 prey categories were identified in the scats of Geoffroy's cat (**Table** 1). Small-sized mammals (*Thylamys pallidior*, *Akodon iniscatus*, *Calomys musculinus*, *Eligmodontia typus*, *Reithrodon auritus*, *Galea leucoblephara*, *Ctenomys bidaui*, and unidentified small rodents) were the most common preys and accounted for the highest biomass contribution (37.2%) followed by medium-sized mammals (*Dolichotis patagonum*, *Zaedyus pichiy*, and *Lepus europaeus*; 34.6%) (**Table** 1). At the species level, the rodents *A. iniscatus*, *G. leucoblephara*, and *E. typus* were the most frequent prey items in the diet of Geoffroy's cat. Birds, reptiles, and insects were less representative in number and biomass (**Table** 1).

In the small mammal sampling, 790 individuals belonging to eight species of small-sized mammals were captured. The most frequently captured species in the Sherman live traps were *E. typus* (589), followed by *C. musculinus* (72), *R. auritus* (67), *A. iniscatus* (26), and *Graomys griseoflavus* (24). The least captured species were *Akodon dolores* (8), *T. pallidior* (3), and *G. leucoblephara* (1). The frequency of each species of small-sized mammals in the diet of Geoffroy's cat was not correlated with their respective capture frequency in the field (rs = 0.34, p = 0.37, degrees of freedom = 7; **Table** 1). *A. dolores* and *G. griseoflavus* were captured with traps but were

Table 1

Prey items consumed by *Leopardus geoffroyi* in San Pablo de Valdés Wildlife Reserve, Patagonia, Argentina. The values shown represent the prey average body mass (g), number of individuals, biomass contributed by all prey (%), prey frequency in the diet (%), capture frequency of small-sized mammals with Sherman traps (%), and frequency of medium-sized mammals recorded in pedestrian transects (%).

Prey taxa	Body mass (g)	N° of individuals	Biomass (%)	Prey frequency (%)	Sherman frecuency (%)	Transects frequency (%)
Mammals			**71.81**	**78.3**		
Didelphimorphia						
Thylamys pallidior	19.5	2	0.40	2.41	0.46	-
Rodentia						
Akodon iniscatus	20	12	2.5	14.46	3.67	-
Akodon dolores	37	-	-	-	1.22	-
Calomys musculinus	14	7	1.0	8.43	9.17	-
Eligmodontia typus	19	9	1.8	10.84	71.41	-
Graomys griseoflavus	54	-	-	-	3.67	-
Reithrodon auritus	19	1	0.20	1.20	10.24	-
Galea leucoblephara	165	11	18.8	13.25	0.15	-
Dolichotis patagonum[bc]	8000	1	2.91	1.20	-	48.5
Ctenomys bidaui	160	4	6.60	4.82	-	-
Unidentified small rodents[a]	82.75	7	6.0	8.43	-	-
Cingulata						
Zaedyus pichiy[b]	977	3	30.30	3.61	-	3.32
Chaetophractus villosus	3500	-	-	-	-	8.62
Lagomorpha						
Lepus europaeus[bc]	3800	8	1.4	9.64	-	39.6
Birds			**27.28**	**12.05**		
Tinamidae						
Eudromia elegans	727.5	2	15.0	2.41	-	-
Unidentified Tinamidae[a]	472.25	2	9.8	2.41	-	-
Unidentified Passerifomes[a]	40	6	2.5	7.23	-	-
Reptiles			**0.91**	**8.43**		
Squamata						
Liolaemus sp.	5.3	3	0.16	3.61	-	-
Colubridae[a]	18	4	0.74	4.82	-	-
Insects			**0.0072**	**1.20**		
Coleoptera[a]	0.7	1	0.0072	1.20	-	-
Total of prey individuals		**83**				
Total Biomass[d]			9677.31			

Mean body mass of the most closely related identified taxon.
[b] *Data were obtained from pedestrian diurnal transect survey.*
[c] *Correction factor (Y = 1,98 + 0,035 * P; Y is biomass consumed; P is average prey weight.*
[d] *Represents the sum of the biomass contribution of each individual prey item consumed.*

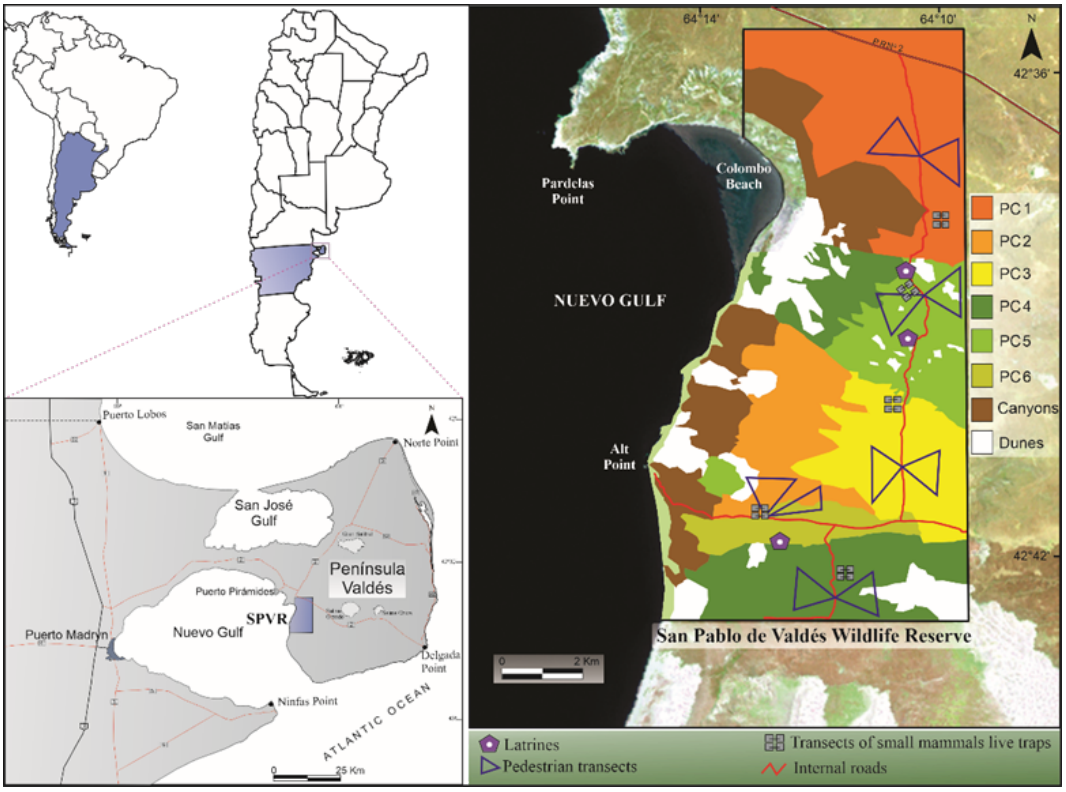

Fig. 1. Location of San Pablo de Valdés Wildlife Reserve, Patagonia, Argentina. Latrines used by *Leopardus geoffroyi*, pedestrian transects, transects of small-sized mammal live traps, and plant communities (PC) are shown. PC1: medium shrub-steppe dominated by *Chuquiraga avellanedae*, *Lycium ameghinoi*, *Schinus johnstonii*, *Menodora robusta*, and *Acantholippia seriphioides*; PC2: shrub-grass steppe dominated by *C. avellanedae*, *Nassella tenuis*, *Poa lanuginosa*, and *Piptochaetium napostaense*; PC3: high shrub-grass steppe dominated by *C. erinacea hystrix*, *C. avellanedae*, *A. seriphioides*, *N. tenuis*, *P. napostaense*, and *Pappostipa speciosa*; PC4: dwarf shrub-grass steppe dominated by *Hyalis argentea*, *N. tenuis*, and *P. lanuginosa*; PC5: grass steppe dominated by *Sporobolus rigens*, *P. lanuginosa*, and *N. tenuis*; and PC6: grass-shrub steppe dominated by *S. rigens*, *N. tenuis*, and *P. napostaense*.

not present in the diet of Geoffroy's cat (**Table** 1). Conversely, *C. bidaui* was consumed by Geoffroy's cat but was not captured in the field (**Table** 1). *A. iniscatus*, *G. leucoblephara*, and *T. pallidior* were found more frequently in the diet of Geoffroy's cat compared to their capture frequency in the field (**Table** 1). *C. musculinus* was consumed approximately as a function of capture frequency (**Table** 1). Interestingly, *E. typus*, the species most frequently captured with traps, was the third item mostly found in the diet of Geoffroy's cat (**Table** 1). As to the small-sized mammals captured, *E. typus*, *A. iniscatus*, and *C. musculinus* were caught in all the PCs considered in this study (**Fig**. 2). The PC with the highest species captures record was PC1, followed by PC2 + PC6 (**Fig**. 2).

The frequency of each medium-sized mammal species in Geoffroy's cat's diet was not correlated with their respective frequency in the field (rs = 0, p = 1.0, degrees of freedom = 2; **Table** 1). Similarly, the most frequent species recorded in Geoffroy's cat's diet was *L. europaeus*, followed by *Z. pichiy* and *D. patagonum* (**Table** 1). The most frequent species recorded in the field was *D. patagonum*, followed by *L. europaeus* and *Z. pichiy*. Medium-sized mammals were recorded in all PCs (**Fig**. 3), with PC5 presenting the highest species richness, followed by PC2 + PC6 (**Fig**. 3). Prey items found in the latrines, compared annually, do not show significant differences between them (p = 0.242). However, significant seasonal differences were noted (p = 0.000544).

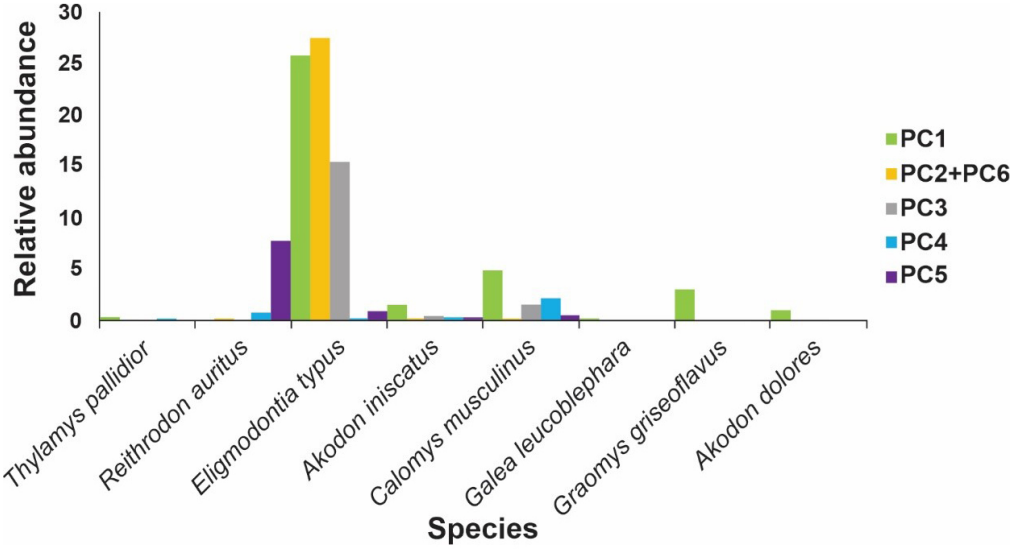

Fig. 2. Relative abundance (percentage of total number of captures) of small-sized mammal prey species recorded in plant communities (PC) in San Pablo de Valdés Wildlife Reserve, Patagonia, Argentina.

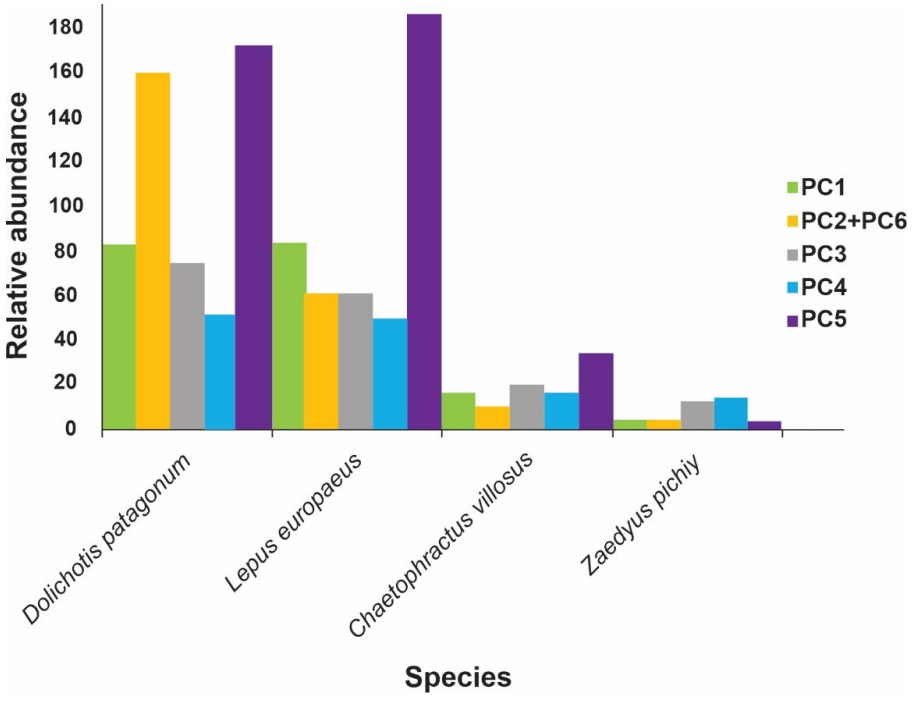

Fig. 3. Relative abundance (number of evidence/kilometers traveled) of medium-sized mammal species recorded in plant communities (PC) in San Pablo de Valdés Wildlife Reserve, Patagonia, Argentina.

From the analysis of the images obtained by camera traps installed in each latrine, we obtained 114 independent photographic events (IE; each separated every 60 minutes) of the Geoffroy's cat. The

total sampling effort was 628 trapping nights. The Geoffroy's cat presented a cathemeral activity pattern in latrines (**Fig**. 4), with greater nocturnal (52.6%) than diurnal activity (48%).

DISCUSSION

Our results demonstrate that the Geoffroy's cat feeds primarily on small-sized mammals and, secondarily, on hares (*L. europaeus*), which corroborates previous studies in the steppes of northern Patagonia (Novaro et al. 2000; Palacios et al. 2012). Similarly, the high frequency of small-sized mammals found in this study was observed in other biomes in Argentina, such as Pampas grassland (Guidobono et al. 2016; Manfredi et al. 2004; Vuillermoz 2001) and Monte scrubland (Bisceglia et al. 2008, 2011; Pereira et al. 2012). Birds were the third group most consumed, followed by reptiles and arthropods, a pattern similar throughout the species distribution (Bisceglia et al. 2008; Guidobono et al. 2016; Manfredi et al. 2004; Pereira et al. 2012; Sousa & Bager 2008), indicating that their diet does not undergo substantial variations.

In this study, small-sized mammals account for almost 40% of the biomass consumed by Geoffroy's cat, suggesting that they are energetically profitable prey. Our findings are in agreement with those reported by Bisceglia et al. (2008) and by Mukherjee et al. (2004), which show that the consumption of small mammals is energetic and less costly and provides high energy retribution, highlighting their importance in the diet of Geoffroy's cat.

It is well known that predators and prey follow, respectively, predatory, and anti-predatory strategies, and that prey inefficient anti-predatory strategies may increase vulnerability to predation. These anti-predatory strategies involve either morphological features (e.g., size of the auditory bullae, length of the forelimbs) or behavioral traits (e.g., bipedal locomotion, use of dense cover, differential activity pattern; see Dickman 1992; Kotler 1984; Rosenzweig 1973; Tabeni et al. 2012; Taraborelli et al. 2003. For example, the high consumption of *Akodon iniscatus* by Geoffroy's cat could be attributed to its vulnerability to predation. The fact that this rodent has short limbs and a quadruped gait rather than a bipedal gait, as is the case of *Eligmodontia typus*, leads to the assumption that it is more susceptible to being captured (Tabeni et al. 2012; Taraborelli et al. 2003).

As to the consumption of medium-sized mammals, *L. europaeus* was numerically the most important species found in the diet of Geoffroy's cat. These lagomorphs are vulnerable to predation, as was demonstrated by Novaro et al. (2000) and Palacios et al. (2012), possibly because they can be easily trapped when laying under bushes. Interestingly, *D. patagonum*, whose adaptations for locomotion, such as elongated limbs, a digitigrade foot posture (Climaco Das Chagas et al. 2019), and its preference for open spaces with sparse vegetation (Alonso Roldán & Baldi 2017), may lead to lower vulnerability to predation, especially considering that it was the most recorded species in the study area.

We observed that the frequency of each small- and medium-sized mammal species in the diet of Geoffroy's cat was not correlated with their respective capture frequency by live traps and pedestrian transects. These results lead to the assumption that this species does not feed on the most abundant species, according with previous studies (Bisceglia et al. 2011; Pereira et al. 2012).

Conversely, the consumption of a higher percentage of small-sized mammals with nocturnal, crepuscular, and diurnal activity is consistent with the cathemeral activity pattern of Geoffroy's cat recorded in PV (D'Agostino & Udrizar Sauthier 2020). This phenomenon might have increased the probability of predator-prey encounter rate. However, this behavior contrasts with that recorded in northwestern Patagonia by Gantchoff & Belant (2016), who claim that Geoffroy's cat has nocturnal habits in coincidence with those of the hare, another of its main prey.

Some of the differences among the most consumed small-sized mammals in relation to their capture frequency might be due to the sampling method used. Species such as *Galea leucoblephara* and *Ctenomys bidaui*, are usually underrepresented because they are not captured in Sherman traps. However, *C. bidaui* is a species commonly recorded in PV via pedestrian diurnal transect surveys (burrows) and owl pellet analyses (*Tyto furcata*; D'Agostino et al. 2017; Gonzalez et al. 2023). The absence of *Graomys griseoflavus* in the diet of Geoffroy's cat might be due to its anti-predatory strategies (ability to jump; Taraborelli et al. 2003) and occurrence restricted to environments with dense shrub cover, such as PC1, which provides better shelters thanks to its structural complexity. Our results indicate that the structural complexity of PC1 and PC2 + PC6 is consistent with a high diversity of small-sized mammal species (D'Agostino et al. 2017), which might provide a higher prey availability for Geoffroy's cat individuals whose latrines are located close to these PCs.

Interestingly, among the prey items consumed by the Geoffroy's cat, we do not record the large

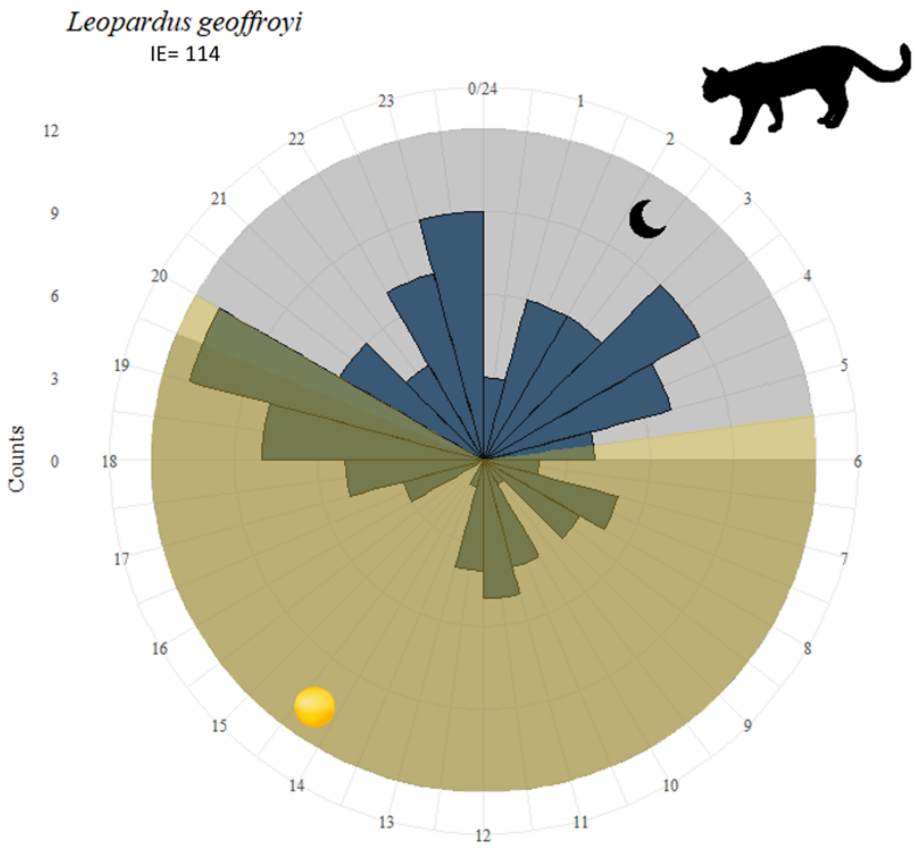

Fig. 4. Number of independent photographic events per hour for Geoffroy's cat in the three latrines studied in San Pablo de Valdés Wildlife Reserve, Patagonia, Argentina.

hairy armadillo (*Chaetophractus villosus*), which was commonly recorded in SPVR (D'Agostino et al. 2017; Ezquiaga et al. 2021) and is a frequent prey in other Argentinean localities (Canepuccia et al. 2007; Bisceglia et al. 2008). Seasonal differences in prey items found in latrines, likely are due to changes in taxa availability in the study area, such as the low representation of reptiles, insects, and even some species of birds during cold weather seasons (Bisceglia et al. 2008; Canepuccia et al. 2007; Pereira et al. 2006).

In PV rural workers report the predation of *Ovis aries*, a domestic species, by Geoffroy's cat. They mention that this species kills lambs during spring but also adult sheep throughout the year (Nabte 2010; D'Agostino in prep.). In this study, *O. aries* was not consumed by Geoffroy's cat. This is indicative that in SPVR the species does not feed on domestic species from surrounding areas. The latter is not a minor point, mainly if it is taken into account that livestock establishments are located approximately 2 km from the latrines studied herein. It is precisely in these establishments where human-felid conflict, either in retaliation or as a preventative measure, occurs, and this, in turn, affects biodiversity.

To our knowledge, this is the first study to describe the diet of Geoffroy's cat in central Argentinean Patagonia. Our findings improve our understanding of the feeding ecology of this species, which is exposed to different anthropogenic disturbance types, by providing baseline information on its diet and subsidizing its conservation. However, further studies, including areas where Geoffroy's cat is exposed to diverse land use scenarios, are still necessary. They will undoubtedly contribute to our knowledge of the ecological issues and conservation risks to which this species is exposed in Argentinean Patagonia.

CONCLUSIONS

The analysis of Geoffroy's cat feces performed in this study provides reliable data on its diet and minimally interferes with the behavior of the species. Our findings clearly show that Geoffroy's cat feeds only on wild species, with no evidence of domestic species, such as *Ovis aries*, which are found in the surrounding areas. This is important information considering that Geoffroy's cats are subject to retaliatory hunting under the assumption that they are prey on livestock (Nabte 2010; D'Agostino in prep.). Management actions in the Península Valdés Protected Natural Area should therefore give priority to wild prey conservation, such as reducing grassland overgrazing, not only to mitigate livestock predation by Geoffroy's cat but also to conserve the species in a site where livestock activity is one of the main economic activities (Blaum et al. 2007, 2008; Meik et al. 2002; Teta et al. 2014; Thiele et al. 2008). In line with this and based on the findings derived from this study, it is clear that thorough further research, including the diet of Geoffroy's cat in livestock establishments, is of pivotal importance and that working together with rural workers to learn about the human dimensions of the conflict with predators will help propose management guidelines to reduce human-wildlife conflict. Additionally, complementing the micromammal assemblage study through Sherman traps with feces analysis would be beneficial. This is due to weaknesses in the trapping methodology (e.g., bait used must be suitable for the entire diversity of micromammals in the area under study; traps can remain inactive, reducing the probability of captures and Sherman traps are not suitable for capturing certain burrowing species, such as Ctenomyidae). These limitations highlight the value of integrating feces analysis, offering a non-invasive method that can overcome some of the challenges associated with trap-based approaches.

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