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Selection of waterbirds by Geoffroy's cat: Effects of prey abundance, size, and distance

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Abstract

In spite of its wide distribution, Geoffroy's cat (*Oncifelis geoffroyi*) has been recently upgraded from Least Concern IUCN category to Near Threatened because of lack of knowledge. In this study, we examine at the Mar Chiquita Biosphere Reserve (37° 46'S, 57° 27'W; Argentina) their seasonal diet, and their feeding preference in relation to waterbird abundance, size, and distance of waterbird prey before attack. The diet, evaluated by feces analysis, was comprised of 42% waterbirds and 40% small mammals. The relative importance of waterbirds in the diet changed throughout the year associated with seasonal fluctuations in their availability. Predation on waterbirds increased from autumn to summer, while predation on small mammals decreased during this period. Trophic-niche breadth for prey occurrence was higher in autumn and lower in spring. We found that abundance, distance of waterbird prey before attack, and prey size were significant predictors of waterbird consumption by the Geoffroy's cat. This small cat appears to change its kill rate in relation to waterbird abundance changes. The overconsumption of prey close to vegetation and big prey indicates selective predatory behavior by this cat.
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Key words: *Oncifelis geoffroyi*, food habits, prey selectivity

Introduction

Predator food habits are contingent upon different factors that affect costs and benefits of prey consumption (e.g., Griffiths 1975; Stephens and Krebs 1986), such as prey abundance, prey size, and accessibility of prey (Crawley 1992). However, few studies have evaluated simultaneously the trade off among these prey's attributes on predator choice, particularly for a small-size predator. The small wild Geoffroy's cat, *Oncifelis geoffroyi* (D'Orbigny and Gervais 1844), is widely distributed in South America, from southern Bolivia and the Paraná basin of southern Brazil to the southern tip of Patagonia (Ximenez 1975). In spite of this wide distribution, its conservation status has been recently upgraded from Least Concern IUCN category to Near Threatened because of lack of knowledge (Nowell 2002). Studies of its feeding behavior suggest that this species opportunistically switches prey (see Murdoch 1969) on the basis of local and

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geographic prey abundance change (Johnson and Franklin 1991; Novaro et al. 2000; Manfredi et al. 2004).

In the eastern portion of the Argentinean Pampas, *O. geoffroyi* is a common predator (Farias and Canepuccia 2001). Our data describing *O. geoffroyi* annual food habits were previously reported in a regional comparison among three areas of the Argentine Pampas grassland. This study shows that, in the Mar Chiquita Reserve, *O. geoffroyi* frequently preys on waterbirds (see Manfredi et al. 2004) in areas near dense grasslands of *Spartina densiflora* surrounding bird roosting areas (Canepuccia 2005). Waterbird species constitute the most abundant and largest potential prey in the area (Ferrero 2001; Canepuccia 2005), using beaches for feeding and/or roosting, and establishing large mixed flocks on non-vegetated sandbars (Ferrero 2001). Within these flocks, waterbird species are highly variable in size, abundance and spatial arrangement, which constitutes an appropriate scenario to assess possible factors influencing prey preferences by this wild small cat.

If predator choices are contingent upon prey attributes, such as prey availability and energy constraints (Bozinovic and Medel 1988; Jaksic 1989), these prey attributes (abundance, size and distance of prey before attack) should affect predator choice. The aim of this study was to investigate if *O. geoffroyi* shows opportunistic behaviors by responding to seasonal changes in waterbird prey abundance or shows selective behaviors. Particularly, we analyzed: their seasonal diet, and their feeding preference in relation to waterbird abundance, size, and distance of waterbird prey before attack.

Material and methods

Study area

The study was carried out in the area of the Mar Chiquita coastal lagoon, (Argentina 37° 46′S, 57° 27′W) one of the most important wetlands in the Argentinean Pampas region, being a UNESCO Man and the Biosphere Reserve (UNESCO 1996; Iribarne 2001). The lagoon is located at the East of the Pampas region, an area characterized by extensive natural grasslands, now moderately modified by agriculture development. *Spartina densiflora* is the dominant species in the low and middle marshes all around the lagoon (Isacch 2001; Bortolus et al. 2004). The climate is temperate humid to sub-humid, with a noticeable temperature seasonality (Reta et al. 2001). This protected area is located in the southern limit of the Flooding Pampas region (Soriano et al. 1992).

The area shows a topographically variable wetland and many waterbirds use its beaches for feeding and/or roosting, where they concentrate in large flocks (Palomo et al. 1999; Ferrero 2001). These waterbirds represent the dominant vertebrate group in the reserve with ducks (*Anas* spp.) and coots (*Fulica* spp.) as the most frequent taxa (Ferrero 2001). Several murid species (Rodentia: Myomorpha), and a large cuis, *Cavia aperea* (Rodentia: Caviomorpha) are also widespread in the area (Malizia et al. 2001). The hare *Lepus europaeus* is the most frequent medium-sized mammal found in the area. The *O. geoffroyi* (males 4.8 kg; females 4.2 kg, Johnson and Franklin 1991) and the Pampa's fox *Pseudalopex gymnocercus* (males 4.6 kg; females 4.2 kg, Crespo 1971) are the largest mammalian predators in the area. Other smaller carnivores here include *Galictis cuja* and *Conepatus chinga* (Farias and Canepuccia 2001). According to reserve warden and farmer comments, *O. geoffroyi* population in this area has declined during the past 10 years, possibly because of increased agricultural and cattle-raising activities.

Sampling

Fecal sampling was carried out from May 1997 to February 1998 along seven transects, 2 km each, in the study area. Three transects were performed along the shoreline of the lagoon, two transects perpendicular to the shoreline and two parallel and 3 km apart from the shoreline (Fig. 1). Feces were assigned to *O. geoffroyi* by the presence of hairs ingested while grooming (Emmons 1987). The hairs of *O. geoffroyi* have a partitioned medulla, characterized by a whitish pattern of coloration with thin dark brown strips and a dark end (Chehébar and Martín 1989).

Fecal analysis

Feces were dried at 60 °C for 24 h and examined following the standard method of drying and washing materials through a 0.5 mm mesh sieve (following Reynolds and Aebischer 1991). Diagnostic remains (hair, bones, nails, teeth and

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