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DIET OF LONG-WINGED HARRIER (*CIRCUS BUFFONI*) IN SOUTHEASTERN BUENOS AIRES PROVINCE, ARGENTINA

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The long-winged harrier (*Circus buffoni*) is widespread in South America ranging from Venezuela to Chubut Province in Argentina, occasionally reaching as far south as Tierra del Fuego (Nores and Yzurieta 1980) and central Chile (del Hoyo et al. 1994). Found throughout Argentina in open fields, grasslands, savannas, marshes, wetlands and ponds from sea level to 690 m elevation (Canevari et al. 1991, De la Peña 1992, del Hoyo et al. 1994), it is most abundant in the Chaco-Pampean zone of Argentina, Uruguay and Brazil (Grossman and Hamlet 1964).

Studies of the long-winged harrier have focused mainly on its nesting biology (Narosky and Yzurieta 1973), and there is only descriptive information on its diet (De la Peña 1985, Canevari et al. 1991, López 1993, del Hoyo et al. 1994) and hunting habitats (Narosky and Yzurieta 1973, 1988, De la Peña 1985). The objective of this study was to determine the diet and niche breadth of long-winged harriers in the Pampas zone of Argentina.

Our study was conducted in the Laguna de los Padres Integral Reserve (37°56′S, 57°44′W) 16 km west of Mar del Plata City, Buenos Aires Province. The reserve covers a 680 ha area with low hills and plains. Mean annual temperature is 13.8°C and mean annual precipitation is nearly 5 cm. Harriers selected for study were located in a 87 ha area within the reserve called the "El Curral" Intangible Reserve Zone. It consists of a mosaic of shrubland habitat with native "curro" (*Colletia paradoxa*), exotic blackberry (*Rubus ulmifolius*) and modified Pampean grassland comprised of *Stipa* spp., *Bothriochloa* spp., *Conium* spp. and *Carduus* spp. (Cabrera and Zardini 1978). Cultivated fields, pastures, tree plantations (mainly *Eucalyptus*) and suburban zones surround the study area, and it is only 400 m from Laguna de Los Padres, where there is a large concentration of breeding, aquatic birds including brown-hooded gulls (*Larus maculipennis*), white-faced ibises (*Plegadis chihi*), snowy egrets (*Egretta thula*), cattle egrets (*Bubulcus ibis*), black-necked swans (*Cygnus melanocorypha*) and coots (*Fulica* spp.).

During springs and summers of 1992–93 and 1993–94, pellets and prey remains were collected every 5–6 d at nest sites, plucking stations and roosts of breeding pairs of long-winged harriers. Bird, mammal and insect remains were identified based on bones, feathers, bills, hair, dentaries and exoskeletons, and compared with specimens in collections of Museo de Ciencias Naturales de La Plata, Museo de Ciencias Naturales "Lorenzo Scaglia" de Mar del Plata and Laboratorio de Vertebrados, Facultad de Ciencias Exactas y Naturales-Universidad Nacional de Mar del Plata. All remains in a collection were lumped and prey items were identified using known remiges, rectrices, bills and bones of birds and fur, skull parts and feet of mammals. This procedure minimized the possibility of overcounting numbers of individuals of each species (Reynolds and Meslow 1984, Marti 1987). Most prey were identified to the species level.

Adult bird and mammal weights were obtained from the literature (Fiora 1933, De la Peña 1987, Salvador 1988, 1990, Navas 1991, Camperi 1992) and unpublished data of Kittleim, Comparatore and Barbini, and in the Museo de Ciencias Naturales "Lorenzo Scaglia" de Mar del Plata. Following Pavez et al. (1992) and Jiménez (1993), a weight of 1 g was assigned to each insect prey species. When the sex of prey could not be determined, the mean weight of males and females was used. Geometric mean (±SE) weight for total prey was calculated (Marti 1987) and Levins' index of niche breadth (Marti 1987) was calculated as:

$$B = \frac{1}{\sum_{i=1}^{n} p_i^2}$$

where p_i is the proportion of individuals in each prey category. B varies from 1 to N with N being the number of prey categories. If prey are equally common in all categories, then $B = N$; if all prey belong to only one category, $B = 1$.

We located 4 and 2 pairs of breeding harriers in 1992–93 and 1993–94, respectively, and made a total of 46 pellets and 28 prey remains. Pellets averaged 41.8 ± 10.4 mm (±SD) in length and 17.9 ± 2.9 mm wide ($N = 38$). A total of 98 prey items was identified from 3 taxonomic classes including 22 vertebrate species and 2 insect orders (Table 1). Levins' Index (B) of niche breadth was 7.9 ($N = 25$, minus unidentified prey).

Birds accounted for 79.5% of the total prey items, followed by mammals (17.5%) and insects (3%). Among birds, passerines were the most common (61%) prey remains found. Most passerines belonged to the Emberizidae (40%), with rufous-collared sparrow (*Zonotrichia capensis*) the most abundant species. Fringillids, mainly hooded

Table 1. Percent frequency of prey items, weight of individual prey and total percent biomass of prey in the diet of breeding long-winged harriers in southeastern Buenos Aires Province, Argentina. Percentages based on a total of 98 prey items.

PREY	% FREQUENCY	ADULT WEIGHT (g)	% TOTAL BIOMASS
Birds	79.5		68.6
Tinamidae			
Nothura maculos	2.0	240	7.0
Nothura maculosa (egg)	2.0	20	0.7
Threskiornithidae			
Plegadis chihi	3.0	450	19.8
Anatidae			
Anas sp. (chick)	3.0	80	3.5
Rallidae			
Rallus sanguinolentus	1.0	162	2.4
Columbidae			
Columba picazuro	2.0	213	6.2
Zenaida auriculata	3.0	128	5.7
Furnariidae			
Phleocryptes melanops	1.0	16	0.2
Mimidae			
Mimus saturninus	1.0	74	1.1
Emberizidae			
Sicalis luteola	5.0	16	1.2
Sicalis sp.	2.0	16	0.5
Zonotrichia capensis	27.5	22	8.8
Unidentified egg	1.0	2	0.1
Icterinae			
Molothrus bonariensis	1.0	62	0.9
Molothrus badius	1.0	53	0.8
Pseudoleistes virescens	1.0	71	1.0
Sturnella superciliaris	1.0	53	0.8
Carduelis magellanica	11.0	15	2.4
Ploceidae			
Passer domesticus	4.0	31	1.8
Unidentified passeriformes	4.0	21[a]	1.3
Unidentified birds	2.0	96[b]	2.8
Mammals	17.5		31.4
Leporidae			
Lepus capensis (young)	6.0	300	26.4
Cricetidae			
Oxymycterus rufus	2.0	70	2.0
Akodon azarae	4.0	21	1.2
Oryzomys flavescens	2.0	17	0.5
Unidentified cricetidae	1.0	36[c]	0.5
Didelphidae			
Monodelphis dimidiata	1.0	16	0.2
Unidentified mammals	1.0	31[d]	0.4
Insects	3.0		<0.1
Coleoptera	2.0	<1.0	<0.1
Odonata	1.0	<1.0	<0.1

[a] Average of the 4 most common identified passerine birds.
[b] Average of all identified birds.
[c] Average of the 3 identified cricetids.
[d] Average of the identified cricetids and *Monodelphis dimidiata*.

siskin (*Carduelis magellanica*), made up 11% of the diet. Among mammalian prey, rodents were the most numerous (9%) with *Akodon azarae* the most common species followed by lagomorphs (6%) and marsupials (1%).

Long-winged harriers preyed on a wide range of prey sizes with weights ranging from a low of 1 g in the case of insects to a high of 450 g in the case of the white-faced ibis. Geometric mean weight of prey was 32.4 ± 11.2 g (±SE). By weight, birds comprised the majority of the prey biomass (68.6%). White-faced ibises contributed the greatest biomass (19.8%) followed by rufous-collared sparrow (8.8%), spotted tinamou (*Nothura maculosa*, 7%), picazuro pigeon (*Columba picazuro*, 6.2%) and eared dove (*Zenaida auriculata*, 5.7%). Mammals comprised 31.4% of the prey biomass with juvenile European hares (*Lepus capensis*) contributing the largest amount (26.4%). Insect biomass was very low (<0.1%) in the diet.

Our results are similar to those observed for Montagu's harrier (*Circus pygargus*), marsh harrier (*C. aeruginosus*) and hen harrier (*C. cyaneus*), which also prey mainly on birds (González López 1991). During the breeding season, diets of marsh and hen harriers can consist of as much as 70% birds by frequency of occurrence (Schipper 1973, Witkowski 1989, González López 1991, del Hoyo et al. 1994). Several authors (De la Peña 1985, 1992, Canevari et al. 1991) have mentioned that long-winged harriers hunt mainly in wetlands, ponds and marshes. The type of prey in our study was mainly from terrestrial habitats (91%) and was probably related to the fact that cultivated fields, pastures, and tree plantations surrounded the study area.

RESUMEN.—Se estudió la dieta del gavilán planeador (*Circus buffoni*) durante dos períodos reproductivos en la Reserva Integral Laguna de Los Padres, Provincia de Buenos Aires. El área de nidificación se encuentra en un ambiente arbustivo, circundado por campos cultivados, pasturas, montes, lagunas y ambientes suburbanos. Se analizaron 46 egagrópilas y 28 restos presa, provenientes de seis parejas nidificantes. Se identificaron 98 items presa, correspondiendo el 79.5% a las aves, el 17.5% a los mamíferos y un 3% a los insectos. La amplitud de nicho trófico (B) fue de 7.9 ($N = 25$). Los paseriformes fueron las presas más consumidas (61%), dentro de las cuales el chingolo (*Zonotrichia capensis*) y el cabecita negra común (*Carduelis magellanica*) fueron las especies más frecuentes. La media geométrica del peso de presas consumidas fue de 32.4 ± 11.2 (± ES). En cuanto a la biomasa aportada, las aves y los mamíferos contribuyeron en un 68.6% y 31.4%, repectivamente. La dieta del gavilán planeador mostró similitud con la de otras especies del género *Circus*.

[Traducción de Author]

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