



## Dry season diet composition of *Eligmodontia moreni* (Rodentia, Cricetidae, Sigmodontinae) in a hyper-arid region of the Monte desert (Mendoza, Argentina)

*Composición de la dieta de Eligmodontia moreni (Rodentia, Cricetidae, Sigmodontinae) durante la estación seca en una región hiperárida del desierto del Monte (Mendoza, Argentina)*

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### SUMMARY

We report the diet of *Eligmodontia moreni* during a dry season in a hyper-arid region of the Monte desert. Most eaten items were plant leaves, arthropods and seeds. Besides the high consumption of leaves, it should be considered as omnivorous with tendency to herbivory due to the high variability in consumption. The high consumption of arthropods was not recorded for other species of the genus. *E. moreni* shows a high flexibility in the diet, and this may be advantageous in these unpredictable environments.

### RESUMEN

Presentamos la dieta de *Eligmodontia moreni* durante la estación seca en una región hiperárida del desierto del Monte. Encontramos diferencias en el consumo de las diferentes categorías, resultando las hojas y los artrópodos los ítems más utilizados, seguidos por las semillas. A pesar del elevado consumo de hojas, la especie debe considerarse omnívora con tendencia a la herbivoría debido a la elevada variabilidad en su dieta. Los altos porcentajes de artrópodos en la dieta no han sido registrados para otras especies del género. *E. moreni* muestra una importante flexibilidad en la dieta lo cual puede resultar ventajoso en ambientes donde los recursos tróficos son escasos e impredecibles.

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**Key words:** Desert rodent, microhistological technique, omnivory, Telteca Reserve

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**Palabras clave:** Omnivoría, Reserva Telteca, roedor de desierto, técnica microhistológica

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## INTRODUCTION

Among the different resources used by a species, food is considered one of the most important because it provides the energy necessary for survival and reproduction (Manly *et al.*, 2010). Particularly, in systems such as deserts where productivity is very low and precipitations are scarce and highly unpredictable, small mammals can adopt different dietary strategies for coping with challenges of survival and reproduction (Kerley, 1992). In North American deserts, granivory is the dominant dietary strategy among rodent species; while in Australian, South African and South American deserts the most common dietary strategies of small mammals are insectivory, omnivory and herbivory respectively (Mares & Rosenzweig, 1978; Kerley, 1992; Murray *et al.*, 1999; Campos *et al.*, 2001; Giannoni *et al.*, 2005).

The genus *Eligmodontia* (Cuvier, 1837) is characteristic of the arid lands of South America and possesses several anatomical and physiological adaptations for xeric environments (Díaz & Ojeda, 1999). Nevertheless, of six recognized species of the genus, only the diets of *E. typus* (Cuvier, 1837) and *E. hirtipes* (Thomas, 1902) have been documented. Both species are considered omnivorous, being leaves the main consumed food item (Campos *et al.*, 2001; Silva, 2005; Giannoni *et al.*, 2005). These species are completely allopatric, occurring *E. hirtipes* in the Altiplano of Chile and *E. typus* in the Central Monte desert of Argentina (Lanzone, 2009).

In the Central Monte desert, another species of the genus also occurs: *E. moreni* (silky mouse), occupying the northern and more arid portion of the Monte biome (Lanzone *et al.*, 2007). This

species is sometimes found in sympatry with *E. typus* and three other phyllotine rodents in hyper-arid regions, with mean annual precipitations values of 150 mm, and low resource availability (Rodríguez *et al.*, 2012). Recent research shows that this species is a habitat generalist, with a wide habitat niche breadth and greatest abundances in open habitats such as sand dunes and saltbushes (Rodríguez *et al.*, 2012). But basic information about the natural history of *E. moreni*, such as diet, is absent in literature. Therefore, our main objective is to describe the composition of the diet of *E. moreni* during the dry season in a hyper arid portion of the Monte desert, in order to assess the feeding strategy of the species when the productivity is low and resource availability is reduced.

## MATERIAL AND METHOD

During a field expedition in May of 2004 to the locality of Telteca Reserve (Central Monte desert biome, Mendoza, Argentina) we captured 17 specimens of *Eligmodontia* with live Sherman traps. Animals collected during this study were treated following the procedures recommended by the American Society of Mammalogists (Sikes *et al.*, 2011). All individuals were karyotyped in order to corroborate their taxonomic status (Lanzone *et al.*, 2007). This analysis showed that 16 animals were *E. moreni* ( $2n = 52$ ) and one was *E. typus* ( $2n = 44$ ).

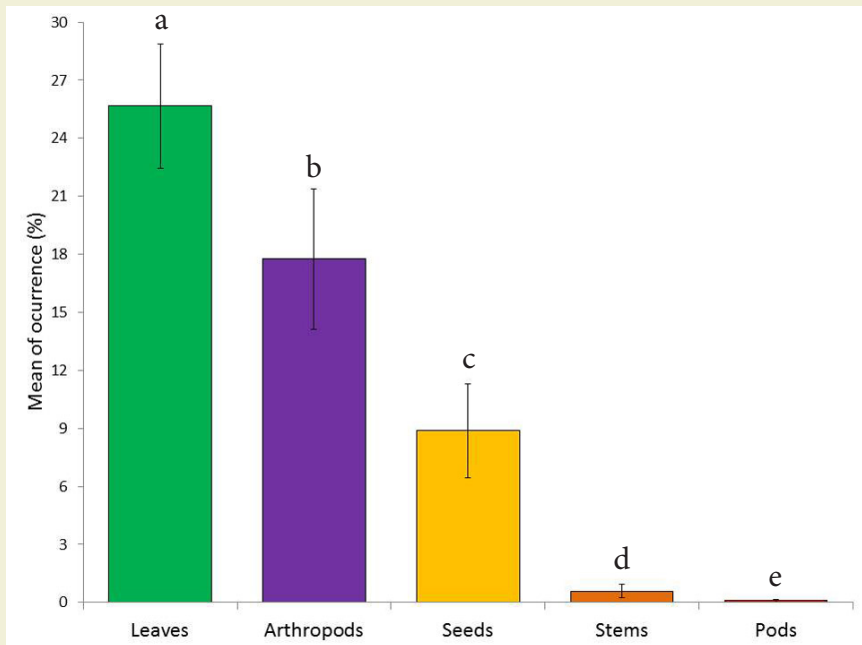
Feces of 12 *E. moreni* individuals were collected from depositions obtained in the traps or at the time of manipulation. Microscopic identification of plant species was performed by comparison with a reference collection, which consisted of microhistological slides of plant material. The reference material and the fecal

samples were processed following the method described by Dacar & Giannoni (2001). Feces from each individual were macerated in a solution of  $\text{NaHCO}_3$  and one microscope slide was prepared. Fifty microscope fields were systematically examined on each slide under a microscope at 400 $\times$ . Presence of food items was recorded for each field. Food items were grouped into the following categories: leaves, seeds, arthropods, stems, and pods. The percentage of occurrence of each item was determined by grouping the results of all individuals. Mean and standard deviation were calculated for all food items and categories without

grouping individuals. A chi-square test was used to compare the absolute occurrences of the different food items in the diet of *E. moreni*. All analyses were performed using R 2.9.0 software.

## RESULTS AND DISCUSSION

We found significant differences among food items consumed by *E. moreni* during the dry season ( $\chi^2=611.03$ ;  $df=4$ ;  $p<0.001$ ), being leaves and arthropods the two most consumed items, followed by seeds (Figure 1). A total of 13 plant species were found in its diet, with leaves of *Lycium* sp. and *Prosopis* sp. being the



**Figure 1.** Percentage of occurrence of items, grouped as categories, in the diet of *Eligmodontia moreni* in Telteca Reserve during the dry season. Different letters show significant differences between categories (Chi-square test)

**Figura 1.** Porcentaje de ocurrencia de los ítems, agrupados en categorías, en la dieta de *Eligmodontia moreni* en la Reserva Telteca durante la estación seca. Las diferentes letras indican diferencias significativas entre las categorías (prueba de Chi-cuadrado)

**Table 1.** Percentage of occurrence, mean and standard deviation (SD) of the specific items present in the diet of *Eligmodontia moreni* in Telteca Reserve during the dry season (Mendoza, Argentina)

**Tabla 1.** Porcentaje de ocurrencia, media y desvío estándar (SD) de los ítems específicos presentes en la dieta de *Eligmodontia moreni* en la Reserva Telteca durante la estación seca (Mendoza, Argentina)

	Percentage of occurrence	Mean of occurrence	SD
Arthropods	35.50	16.55	12.60
Seeds			
<i>Bulnesia retama</i>	4.33	2.36	2.72
<i>Lycium</i> sp.	3.17	1.73	2.39
<i>Larrea</i> sp.	2.67	1.45	3.23
<i>Capparis atamisquea</i>	1.67	0.91	2.33
Pods			
<i>Prosopis</i> sp.	0.17	0.09	0.29
Leaves			
<i>Lycium</i> sp.	34.17	17.00	11.72
<i>Prosopis</i> sp.	13.67	7.45	14.37
<i>Larrea</i> sp.	1.00	0.55	1.24
Chenopodeaceae	0.33	0.18	0.58
<i>Acantholippia seriphioides</i>	0.50	0.27	0.87
Verbenaceae	0.17	0.09	0.29
<i>Senna aphylla</i>	0.50	0.27	0.87
<i>Trichloris</i> sp.	0.17	0.09	0.29
<i>Pappophorum</i> sp.	0.17	0.09	0.29
Cactaceae	0.33	0.09	0.39
<i>Suaeda divaricata</i>	0.33	0.18	0.58
Stems			
<i>Capparis atamisquea</i>	1.17	0.64	1.16

most eaten plants (**Table 1**). According to Kerley and Whitford's (1994) classification, despite leaves consumption was slightly higher than 50% of the total,

it should be considered as omnivorous with tendency to herbivory.

When comparing *E. moreni*'s diet with the related species, *E. typus*, in a close re-

**Table 2.** Mean, standard deviation (SD) and variation coefficient (vc) of the main food categories in the dry season diet of *Eligmodontia moreni* (this publication) and *E. typus* (Giannoni et al., 2005)

**Tabla 2.** Media, desvío estándar (SD) y coeficiente de variación (vc) de las principales categorías que constituyen la dieta de *Eligmodontia moreni* (resultados de esta publicación) y de *E. typus* (Giannoni et al., 2005) en la estación seca

	<i>E. moreni</i> (n=12) Telteca, Argentina Mean ± SD	<i>E. typus</i> (n=11) Ñacuñan, Argentina Mean ± SD
Leaves	51.34 ± 22.26 (vc= 43.37)	34.2 ± 21.6 (vc= 63)
Stems	1.17 ± 1.16 (vc= 99.81)	4.2 ± 4.6 (vc= 110)
Seeds	11.83 ± 14 (vc= 118.3)	29.6 ± 21.3 (vc= 72)
Pods	0.17 ± 0.29 (vc= 173.2)	14.2 ± 15.2 (vc= 107)
Arthropods	35.5 ± 25.19 (vc= 70.98)	17.8 ± 20.9 (vc= 118)

gion (Ñacuñán Reserve, approximately 300 km south), we found both species mainly feed on leaves. Nevertheless *E. typus* incorporates more seeds/pods, while *E. moreni* includes more arthropods (Table 2). Also, high variation coefficients were registered for both species (Table 2). Moreover, the same plant species were the most frequently consumed items (22.17% of *Lycium* sp. and 4.17% of *Prosopis* sp. according to Giannoni et al., 2005).

Similar to other rodents of the Monte desert, and of other arid regions, *E. moreni* shows a varied diet during the dry season, with high standard deviation in the items consumed (Giannoni et al., 2005) and an omnivorous feeding strategy. This flexibility in food intake may be a good strategy in this hyper arid region of the Monte desert, where resources are scarce and unpredictable. The high consumption of arthropod by *E. moreni*, when comparing with *E. typus* could be related to the more xeric habi-

tat of occurrence. In this sense, the presence of arthropods in its diet could act as a protein supplement in time of food shortage (such as the dry season) and be related to physiological mechanisms for keeping a positive water balance on this extreme hyper arid region of Monte desert (Díaz & Ojeda, 1999). This high record of arthropods was not recorded previously for other species of the genus. Further studies are needed including diet analysis in different seasons and of different areas of the hyper arid region of the North of Mendoza in order to understand the extent of omnivory and flexibility in the diet of *E. moreni* and other co-existent species.

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