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Short communication

Microhabitat use by *Eligmodontia typus* (Rodentia: Muridae) in the Monte Desert (Argentina)

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Eligmodontia typus is widespread in southern Peru, western Bolivia, northern Chile, and all along the extent of the Andes mountains of Argentina, from the Salta province down to the Strait of Magellan (Redford and Eisenberg 1992). Typically, it inhabits open vegetation areas with high proportion of bare soil like *Larrea* flatlands, sandy lowland scrub areas, and sandy flats with halophytic plants (Mares 1975a, b; Redford and Eisenberg 1992). In the central Monte Desert, this species dominates sand dune habitats (Corbalán and Ojeda 2004), as well as open shrublands and disturbed grasslands of the Andean piedmont (Gonnet and Ojeda 1998). Ojeda (1989) demonstrated that in areas disturbed by fire, where vegetational complexity decrease, the population of this species increase. However, *E. typus* has been also reported as very abundant in dense shrublands dominated by *Larrea cuneifolia*, with high grass cover (Corbalán and Ojeda 2004).

Using Beta-light, Thompson (1982) was able to demonstrate that the highly specialized rodents of the genus *Dipodomys* spend more time foraging near or beneath bushes, bounding rapidly across open areas, in contrast to results from earlier studies using live trapping. *Eligmodontia typus* shows a morphological similarity with the North American *Dipodomys*, and probably both forage in a similar way. Most of the studies focused on habitat use or habitat selection by *E. typus* have used traditional trapping techniques, in spite of the fact that they can only yield coarse information about movement patterns of this species, and little is known about the effect of baited traps on the behaviour of the animals (Lemen and Freeman 1985).

Other techniques like radio tracking and luminous powder have been used to follow the tracks of animals and estimate microhabitat use. The last method, developed by Duplantier et al. (1984), is very easy to use, cheaper than radio tracking, and shows low toxicity without deleterious effects on the individuals (Lemen and Freeman 1985; Stapp et al. 1994). The purpose of this study was to evaluate microhabitat use by *E. typus* using luminous powder in sand dunes, where this species is dominant (Corbalan and Ojeda 2004).

The study was carried out in November 2000 at the Ñacuñán Biosphere Reserve (12,800 ha), 200 km southeast of Mendoza city, Argentina (34°02′S, 67°58′W). The area belongs to the Monte biome and the vegetation is xerophytic (Morello 1958; Roig 1971). The climate in the Reserve is semiarid and seasonal. Mean annual precipitation is 329.4 mm (period 1972–1992) and rainfall

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occurs mainly in summer months (Estrella et al. 2001).

Different plant communities can be distinguished in the Reserve (Roig 1971). Sand dunes are the most homogeneous habitat, characterized by a high percentage of bare soil, a low cover of shrubs and some isolated trees of *Prosopis flexuosa* (Roig 1971; Corbalán and Ojeda 2004). *Eligmodontia typus* coexists here with three small mammal species (*Calomys musculinus*, *Graomys griseoflavus* and *Akodon moline*) and with the marsupial *Thylamys pusillus*, but these species are present in very low abundance in sand dunes (Corbalán and Ojeda 2004).

To capture individuals, Sherman live traps baited with rolled oat were set along transects in the evening, and checked 3 or 4 h later (10–11 PM). Only adult male animals were chosen for the study to avoid biases due to sex and/or age, since pregnant females and juveniles could show different movement patterns. To avoid overlap between trails left by the animals, we chose those that were captured at least 50 m apart.

Animals were weighed, sexed and dusted with luminous powder (BioQuip, Gardena, CA) inside a plastic bag. Colours used were red (no. 162R) and blue (no. 1162B). Dusted animals were released at the site of capture and the area was left immediately after. In order to avoid interference in the behaviour of the animals, captured individuals not selected for this study (females, youngs and individuals from other species) were released and all free traps were closed before processing the chosen animals.

The next morning, tracks left by the animals were marked with flags until the powder was no longer visible. Microhabitat characteristics were noted every 20 cm along the trail, recording bare soil, presence of litter, trees, shrubs, subshrubs or herbs intercepting a stick 1.5 m long (Point intercepted method, Krebs 1999).

Data from microhabitat measurements were allocated to different categories: (1) "without cover" (litter on the ground or bare soil), (2) "herbs" (when only grasses or forbs touched the stick), (3) "subshrubs" (when subshrubs, but not shrubs or trees, touched the stick), (4) "shrubs" (when shrubs or trees, but not subshrubs, touched the stick, and (5) "complex" (when shrubs (or trees) and subshrubs touched the stick). Categories 2–5 can contain litter on the ground or bare soil, and categories 3–5 can contain herbs.

Generalized Linear Models (GLM) were used to compare the proportion of use among the different categories. Since length of the trails was different for each animal assessed, the frequency of each category was expressed as proportions of the total records for each individual. As these data have a binomial distribution, a logistic regression was performed. Because residual errors in the model showed overdispersion (i.e. residual deviance was higher than the degree freedom of the residual), the model was rescaled to correct for biases in the statistical test of hypotheses (Crawley 1993), using F tests instead of χ^2 as a measure of fit.

In order to know whether the distances travelled beneath different heights of strata were similar or not, we measured segments including successive points under the same situation. We recognized three situations: (1) cover of shrubs or trees, (2) cover of subshrubs or herbs and (3) without cover (bare soil or litter). Then, lengths of trails beneath each of these situations, i.e. lengths of segments, were compared using the non-parametric Kruskall–Wallis test.

Four male individuals were chosen for the study, totalling 719 records of microhabitat use. Following animal tracks was easier with red than with blue powder. The trails left by animals dusted with red were longer than those from animals dusted with blue (Table 1).

Mean travel distance was 76.8 m (SD: $\pm$41.2 m) and mean travelled area was 581.9 $m^2 \pm 414.1$ m^2 (Table 1).

The use of different categories was significantly different (F: 5.93; df $= 4$, 15; $P = 0.005$). The variable "category" per se accounted for more than 60% of the total deviance. The category most used was the shrub cover, which was significantly different from the other categories, and the least used was the complex cover (Fig. 1).

Data from only three of the four individuals were useful to compare travel distances beneath different situations, since the path