

Food Preferences by *Octodon degus* (Rodentia Caviomorpha): Their Role in the Chilean Matorral Composition

Javier A. Simonetti and Gloria Montenegro

Instituto de Ciencias Biológicas, Pontificia Universidad Católica de Chile.
Casilla 114-D, Santiago, Chile

Summary. The food preferences of *Octodon degus* are examined in laboratory test. Results indicate that degus prefer new rather than mature leaves of Chilean matorral shrubs, and that degus do not discriminate between new leaves (equivalents of shrub seedlings) of different shrub species. The significance of degus preferences in relation to matorral composition is discussed.

Introduction

Central Chile matorral is dominated by evergreen sclerophyllous shrubs over a stationnal herbaceous layer (see Mooney 1977). Predominant shrubs are *Colliguaya odorifera*, *Kageneckia oblonga*, *Quillaja saponaria* and *Lithraea caustica* (see Mooney 1977).

The effects of herbivorous small mammals on the matorral vegetation depend on the following herbivores' niche dimensions: microhabitat utilization and food preferences (Fuentes and Simonetti 1981). The distribution and abundance of plant species, and the composition of the plant community can be affected by herbivores (Harper 1969, Fuentes and Etchegaray 1981).

It has been shown that, in the Chilean matorral, the native rodent *Octodon degus* restricts its foraging activity to the neighbourhood of protecting bushes or stone walls (Glanz 1977; Fuentes and Le Boulengé 1977; Jaksic et al. 1979). Fuentes and Jaksic (1981; see also Fuentes and Simonetti 1981) have experimentally shown that degus are capable of killing seedlings of *Quillaja saponaria*, growing near their refuges. Hence, prior to the introduction of the European rabbit (*Oryctolagus cuniculus*), degus could have modified the spatial distribution of shrubs as *Q. saponaria*. At present, rabbits are responsible for seedling mortality both beneath and between shrubs, thus altering the natural renewal of the matorral (Fuentes and Jaksic 1981; Fuentes and Simonetti 1981; see also Simonetti and Fuentes 1981).

We report here the results of an experiment designed to test two hypothesis on the feeding preferences of *O. degus*. The first hypothesis is that *O. degus* does not discriminate between mature leaves of shrubs and seedlings, therefore the impact of this rodent upon seedlings will depend on their relative abundance as compared to the number of mature leaves available.

The second hypothesis is that *O. degus* does not have feeding preferences to the particular seedlings of various shrub species.

Materials and Methods

Fuentes and Simonetti (1981; see also Simonetti and Montenegro 1980) have shown that degus prefer to eat mature leaves of *Colliguaya odorifera* rather than of *Quillaja saponaria*, and that it does not discriminate between *C. odorifera* and *Kageneckia oblonga* or between *K. oblonga* and *Q. saponaria* leaves. Then, for degus, the most palatable mature leaves would be those of *C. odorifera* followed by *K. oblonga* and *Q. saponaria*.

To determine if degus feed selectively on seedlings of these shrubs, we offered the same amount (g) of fresh new and mature leaves of two shrub species at a time (see Table 1). This simple procedure allowed us to verify if degus discriminate between new and mature leaves and if they prefer some specific shrub seedling. Unpublished data of G. Montenegro support the criterion that new leaves and seedlings are equivalent in terms of morphology and leaf density (see Montenegro et al. 1980).

Leaves were weighed before and after feeding; the difference

Table 1a. Amount (g) of leaves eaten by captives *Octodon degus*. Figures are mean \pm two standard error; *n* is the sample size

Shrub	Leaves		<i>n</i>
	mature	new (seedling)	
<i>Colliguaya odorifera</i>	0.26 \pm 0.10	0.70 \pm 0.08	24
<i>Kageneckia oblonga</i>	0.32 \pm 0.28	0.79 \pm 0.16	14
<i>Quillaja saponaria</i>	0.28 \pm 0.20	0.58 \pm 0.24	10

Table 1b. Differences in the consumption of leaves by *Octodon degus*. Values are the probability in which the two means of shrub leaves consumed are statistically different

Shrub	leaves	<i>C. odorifera</i>		<i>K. oblonga</i>		<i>Q. saponaria</i>	
		new	mature	new	mature	new	
<i>C. odorifera</i>	mature	≤ 0.001	> 0.11	≤ 0.001	> 0.86	≤ 0.001	
	new	—	≤ 0.001	> 0.76	≤ 0.001	> 0.32	
<i>K. oblonga</i>	mature	—	—	≤ 0.001	= 0.10	≤ 0.001	
	new	—	—	—	≤ 0.001	> 0.24	
<i>Q. saponaria</i>	mature	—	—	—	—	< 0.01	

between weights, corrected for dehydration, corresponds to the amount consumed. Leaves were offered once a day for five hours in the morning, this is, during the first period of activity of *O. degus* (Fulk 1976). During each experiment, commercial pellets were offered as alternative food, and water was supplied *ad libitum*. Leaves were collected at ground level, at the canopy height reachable by degus.

Results

Independently of the shrub species, degus consume significantly higher amounts of new leaves ($P < 0.001$; Student's test. Table 1). Furthermore, degus consume similar amounts of new leaves from different shrub species: there are no significant differences between its consumption ($P > 0.30$; Table 1).

Discussion

Our results indicate first, that degus prefer eating new leaves (i.e. seedlings) rather than mature leaves of *C. odorifera*, *K. oblonga* or *Q. saponaria*; second, that degus do not discriminate between new leaves (seedlings) of different species.

The preferences exhibited by degus are important only if they are expressed in the matorral. This appears to be the case for *O. degus*.

By one hand, in both disturbed and mature matorral, degus are capable of killing seedlings of *Q. saponaria* growing near their refuges (Fuentes and Jaksic 1981; Fuentes and Simonetti 1981). Moreover, degus do not select any particular shrub species as its refuge, it only seek their protection under the canopy (Yáñez and Jaksic 1978).

By the other hand, about 80% of the seeds of *C. odorifera* are dispersed within a radius of 12 m from the center of the parental shrub, and 40% of the total seeds fall under the canopy protection (Giliberto et al. 1980); then, it can be assumed that seedlings have a similar distribution (see Harper 1977).

Hence, seedlings of shrubs are available and reachable by the degus in the field. Since degus do not discriminate between them, we can propose that, at least for the shrub species described here, degus do not alter the matorral composition.

Acknowledgements. M. Rojas and B. Morales provided us the degus. Financial support was obtained from grants DIUC 71/81 to G. Montenegro and Andean Project MAB (UNEP-UNESCO) 1105-77-01.

References

- Fuentes ER, Etchegaray J (1981) Defoliation patterns in matorral ecosystems. In: F Kruger, F Siegfried (eds), Proceedings Third International Conference on Mediterranean Type Ecosystems, in press
- Fuentes ER, Jaksic FM (1981) The role of European rabbit (*Oryctolagus cuniculus*) in the Chilean matorral: shrub species and refuge effects. *J Appl Ecol*: accepted
- Fuentes ER, Le Boulenger P (1977) Predation et competition dans la structure d'une communauté herbacée secondaire du Chili central. *Terre et Vie* 31:313-326
- Fuentes ER, Simonetti JA (1981) Plant patterning in the Chilean matorral: are the roles of native and exotic mammals different? In: Dynamics and Management of Mediterranean Type Ecosystems: An International Symposium
- Fulk GW (1976) Notes on the activity, reproduction and social behaviour of *Octodon degus*. *J Mamm* 57:495-505
- Glanz WE (1977) Comparative ecology of small mammal communities in California and Chile. Unpublished Ph D Thesis, University of California, Berkeley
- Giliberto J, Gutiérrez JR, Hajek ER (1980) Temperature effect on autochory in *Colliguaya odorifera* (Euphorbiaceae). *Int J Biometeor* 24:199-202
- Harper JL (1969) The role of predation in vegetational diversity. *Brookhaven Symp Biol* 22:48-62
- Harper JL (1977) The population biology of plants. Academic Press, London
- Jaksic FM, Fuentes ER, Yáñez JL (1979) Spatial distribution of the Old World rabbit (*Oryctolagus cuniculus*) in central Chile. *J Mamm* 60:207-209
- Montenegro G, Jordan M, Aljaro ME (1980) Interactions between Chilean matorral shrubs and phytophagous insects. *Oecologia* 45:346-349
- Mooney HA (ed) (1977) Convergent evolution in Chile and California Mediterranean climate ecosystems. Dowden, Hutchinson and Ross, Pennsylvania
- Simonetti JA, Fuentes ER (1981) Microhabitat at release by European rabbits (*Oryctolagus cuniculus*) in central Chile: adult vs juvenile patterns. *Oecologia (Berl)*: submitted
- Simonetti JA, Montenegro G (1980) Preferencias por arbustos de *Octodon degus* (Rodentia: Octodontidae). *Arch Biol Med Exper* 13:112
- Yáñez J, Jaksic F (1978) Historia natural de *Octodon degus* (Molina) (Rodentia, Octodontidae). *Publ Ocas Mus Nac Hist Nat (Chile)* 27:3-11

Received July 28, 1981