

Autumn diet of the edible dormouse in Galicia, northwest Spain

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The autumn diet of the edible dormouse *Glis glis* Linnaeus, 1776 in northwest Spain was investigated on the basis of analysis of the stomach contents of 32 individuals captured in September and October of 1985 and 1986. Remains of *Quercus robur* acorns and *Corylus avellana* hazelnuts accounted for 86.5% of the total dry weight of the 32 samples, while blackberry remains accounted for 10.2%. Remains of vegetative plant structures (leaves, etc) accounted for only 3.3% of total dry weight. Insect remains were frequently present, but in very small amounts (about 0.01% of total dry weight). Dormouse hairs and ectoparasites were also frequently present, presumably as a result of accidental ingestion during grooming.

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Introduction

The edible dormouse (*Glis glis* Linnaeus, 1776) occurs in oak and beech woodlands in the northern part of the Iberian Peninsula. Previous studies have shown this species to be basically herbivorous (Kahmann 1965, Holišova 1968, Castroviejo *et al.* 1974, Morris and Hoodless 1992, Castián 1994, Rodolfi 1994); in typical habitats, feeding upon insects and small vertebrates occurs only occasionally (Vietinghoff-Riesch 1960, Kahmann 1965, Storch 1978, Robel and Leitenbacher 1993). Carnivory appears to play a more important role in some atypical habitats (Franco 1990).

In the work reported here we investigated the composition of the autumn diet of edible dormice in the westernmost part of their range, in a habitat that can be considered optimal.

Material and methods

The study was carried out in the Montes do Invernadeiro Nature Reserve in northwest Spain. This area (altitude 1000–1300 m a.s.l.) is largely occupied by montane deciduous woodland with strong Atlantic influence (Castroviejo 1977). The dominant tree species is *Quercus robur*, other common species being *Acer pseudoplatanus*, *Corylus avellana*, *Fraxinus excelsior*, *Betula celtiberica*, and *Sorbus aucuparia*. The understorey is dominated by *Ilex aquifolium* and *Rubus* sp.

The diet of the edible dormouse was investigated on the basis of analysis of the stomach contents of 32 individuals captured in September and October of 1985 and 1986 by snap traps baited with apple. After capture, the stomach and a part of the small intestine were dissected out and preserved in 5% formalin until examination. Gastrointestinal contents were processed by the method of Korschgen (1971); after removing from the formalin they were dried in an oven at 60–80 °C, weighed on a balance with precision of ± 0.001 g, and examined under a stereomicroscope at a magnification of 10–50 \times . Food items were identified with the aid of a reference collection of material collected over the study period at the study site. Hairs were identified with the aid of Teerink (1991).

Results

The majority of the 32 animals captured were subadults, so that comparisons of diet among age-groups were not possible. Seventeen individuals were male and 14 female; sex could not be determined in 1 individual.

The results revealed a basically herbivorous diet (Table 1). The most frequent remains were of *Quercus robur* acorns and *Corylus avellana* hazelnuts (as we had reported previously; see Gigirey *et al.* 1996). Blackberry seeds were also frequent, with up to 166 seeds in one individual's stomach. Leaf and stem remains were present in small amounts. Birch seeds appear to be an occasional food item.

Animal remains – in all cases of insects and/or arachnids – were frequently present (18 of the 32 stomachs), but in very small amounts. Twelve of the 18 stomachs contained remains of ectoparasites (ticks in 10 stomachs, lice in 2 stomachs). Fourteen of the 18 stomachs contained remains of non-ectoparasitic arthropods: unidentified insect remains in 8 stomachs, aphid remains in 3 stomachs, *Diptera* larvae remains in 2 stomachs, adult *Musca domestica* remains in 1 stomach, ant remains in 1 stomach and arachnid remains in 2 stomachs. All 32 stomachs contained hairs of *Glis glis*. Twelve stomachs contained moss remains.

The results broken down by sex are listed in Table 2. Our results indicate that blackberries made up a significantly greater proportion of the diet of females than of the diet of males (comparison of percentage of individual-stomach dry weight accounted for by blackberry remains by the Mann-Whitney *U* test: $z = -1.9$, $p < 0.05$). The same is true of animal prey (Mann-Whitney *U* test: $z = -2.6$, $p < 0.01$).

Table 1. Stomach contents of the 32 individuals of *Glis glis*. % F – percentage of stomachs containing remains of the type indicated, % TW – percentage of total dry weight accounted for by the food type indicated, % Wm – mean percentage of individual-stomach dry weight accounted for by the food type indicated. Hm (mean trophic diversity) = 0.12 (SE = 0.03, SD = 0.19); Hz (cumulative trophic diversity) = 1.17 (Hurtubia 1973, see also Pielou 1975).

Food type	% F	% TW	% Wm
Nuts (acorns and hazelnuts)	81.2	86.5	78.0
Blackberries (<i>Rubus</i> sp.)	50.0	10.2	12.6
Birch seeds	6.2	0.02	0.02
Vegetative plant structures	21.9	3.3	9.4
Arthropods	56.2	0.01	0.02

Table 2. Stomach contents of the 17 males and 14 females of *Glis glis*. % F and % Wm as defined in the legend to Table 1.

Food type	% F		% Wm	
	Males	Females	Males	Females
Nuts	88	71	86.6	66.0
Blackberries	35	64	1.6	26.8
Birch seeds	6	7	0.003	0.032
Vegetative plant structures	12	36	11.8	7.1
Arthropods	47	43	0.001	0.4

Discussion

The present results indicate that the autumn diet of the edible dormouse in our study area almost exclusively comprises plant material. Similar results have been obtained in previous studies. Kahmann (1965) found that the diet of an Italian population in August comprised largely nuts and blackberries. Holišova (1968) examined the stomach contents of 30 edible dormice from Czechoslovakia, and found that nuts (especially hazelnuts) constituted an important part of the diet, with leaves and other vegetative plant material present only in small amounts. In studies in the Iberian Peninsula, Castroviejo *et al.* (1974) and Castién (1994) have reported that the autumn diet is almost exclusively made up of nuts (beechnuts and hazelnuts) and, in the former, blackberries.

Animal remains are present in only very small amounts in the stomachs of edible dormice, and are probably largely the result of accidental ingestion of insects and other invertebrates present in or on plant food items (Holišova 1968).

In the present study, we have not detected any vertebrate remains. Previous studies have reported the occasional predation on birds (Vietinghoff-Riesch 1960, Storch 1978, Robel and Leitenbacher 1993). It seems likely that such behavior indicate predation of nestlings in man-made nest-boxes, since in areas where nest-boxes are present they are frequently occupied by edible dormice during the active season (Gaisler *et al.* 1977, Pilastro 1990, 1992, Robel and Leitenbacher 1993, Schlund *et al.* 1993). Nest-boxes are not present in our study area.

The presence of hair and ectoparasite remains in the stomach is almost certainly due to accidental ingestion during grooming. Likewise, the ingestion of moss is almost certainly accidental.

Our results indicate that the autumn diets of mainly sub-adult males and females are similar, though blackberries and animal remains were significantly more frequent in the stomachs of females. This result may indicate that accidental ingestion of small animals is particularly frequent during feeding on blackberries, though a larger sample would be necessary to confirm this hypothesis.

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