DISTRIBUTION AND ECOLOGY OF DORMICE (MYOXTDAE) IN SICILY: A PRELIMINARY ACCOUNT

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ABSTRACT – Three dormouse species are recorded in Sicily: ***Myoxus glis,*** *Muscardinus avellanarius* and *Eliornys quercinus.* Their distribution is mapped according to the 10 x 10 km squares of the UTM grid. Data were collected until May 1993, mostly coming from pellet analysis, and direct records (vocalization listening, museum specimens, field observations, literature, etc.). The Fat dormouse (5.3% of 10 x 10 km squares) and the Hazel dormouse (2,1%) are mainly localized within deciduous wooded areas like the beech forests and the hazel groves mixed with oaks and chestnuts of Nebrodi and Madonie. The Fat dormouse is also present in south-eastern Sicily (Monti Iblei) and on in Eolian island (Salina). The Garden dormouse shows the widest distribution (21.2%), ranging from sea level to the beech forests (1600 m a.s.l.). Dormice are rarely preyed upon by Owls in Sicily, generally forming less than 1,5% of the total prey, with the exception the Fat dormouse (5.3%). Other occasional predators, so far recorded, are the Red Fox (*Vulpes vulpes*) and the Lanner (*Falco biarmicus).* Hibernation regularly occurs at high altitudes, but seems to be absent or curtailed in the warm habitats below 500 m a.s.l.

Key words: Dormice, Sicily, Distribution.

RIASSUNTO – *Distribuzione ed ecologia dei Mioxidi in Sicilia: dati preliminari* – Tre specie di Mioxidi vivono in Sicilia *(Myoxus* ***glis,*** *Muscardinus avellanarius, Eliomys quercinus*). Storicamente (1850) essi erano presenti nelle principali aree boscate (Nebrodi, Madonie, Etna), solo nella meta di questo secolo, il Ghiro ed il Quercino furono scoperti alle isole Eolie (Salina e Lipari). Si riporta la carta di distribuzione di ogni specie (griglia UTM, 100 kmq) ricavata dall'analisi della dieta di predatori, osservazioni dirette, trappolamenti ed esemplari citati in bibliografia o conservati nei musei. Il Ghiro (5,3%) ed il Moscardino (2,1%) sono localizzati nei boschi decidui di querce e faggio e, piu in basso di noccioli, querce e castagni dei Nebrodi, Peloritani e Madonie. Il Ghiro ***e*** presente anche sull'Etna ed in un'area meridionale della Sicilia (Iblei). Il Quercino mostra la distribuzione piu ampia (21,2%) ed è presente in una gran varieta di habitat dal livello del mare fino alle faggete delle Madonie. I Mioxidi in Sicilia risultano predati finora occasionalmente dalla Volpe e dal Lanario e raramente dal Barbagianni e dall'Allocco. Solo il Ghiro risulta predato regolarmente ***(5%)*** dall'Allocco e risulta la preda piu importante in termini di biomassa (47%) nei boschi dell'Etna e dei Nebrodi. Il periodo di letargo, desunto da osservazioni dirette e dalle borre, sembrerebbe normale (autunno inoltrato-primavera) alle alte quote e assente o molto ridotto e discontinuo sotto i 400 m.

Parole chiave: Mioxidi, Sicilia, Distribuzione.

INTRODUCTION

Three species of dormice live **in** Sicily: the Fat dormouse *(Myoxus glis italicus* Barret-Hamilton, 1898), the Hazel dormouse *(Muscardinus avellanarius pulcher*

Barret-Hamilton, 1898) and the Garden dormouse *(Eliomys quercinus dichrurus* Rafinesque, 1814). The last species is present with a subspecies *E.q. liparensis* Kahmann,1960 on Lipari island (Eolian archipelago). However, Godena et al. (1978) found no significant biochemical differences between *liparensis* and *dichrurus*.

The only data available for the 19th century are from Mina'-Palumbo (1844, 1868) and Doderlein (1872). These Authors reported the three species for the largest wooded areas of Sicily (Etna, Nebrodi and Madonie). Hazel dormouse was found in the hazel (*Corylus avellana*) and chestnut (*Castanea sativa*) wooded areas.

Since then the presence of the Fat dormouse was recorded by Cristaldi & Amori (1982) on the island of Salina (Eolian archipelago), and the Garden dormouse was reported by Kahmann (1960) from the island of Lipari (Eolian archipelago).

The ecology and distribution of Dormice in Sicily have never previously been studied. At the end of the 1970s, the Sicilian Society of Natural Science launched the Atlas Faunae Siciliae Project, and in 1986, after the success of the first Atlas of Birds of Sicily (Massa, 1985), data collection for the Mammal Atlas was started.

In the present contribution we deal with the distribution and ecology of dormice on the island of Sicily.

METHODS

Dormice distribution was plotted on the 10 x 10 km squares of the U.T.M. grid (Sicily = 283 squares, surrounding archipelagos = 14). Only data after 1970 were considered relevant to the present distribution. They mainly consisted of:

- trapping data, dead animal recoveries and field observations
- museum specimens and published data
- pellet analysis.

For pellet data we recorded also the habitat features (vegetation and altitude) within a radius of 1,5 km from the roosting site of the predator.

Published data on the trophic ecology of diurnal and nocturnal raptors in Sicily (Massa et al., 1991 and references therein; Sara, 1990 and references therein) permitted us to evaluate the predation suffered by dormice. By considering only fresh pellets, less than one month old, it was also possible to gain some information about annual activity patterns.

RESULTS

DISTRIBUTION

The available data permitted to draws the distribution map of each species (Figs. 1-3) and the percentage of the UTM grid squares in which they are present (Table 1). Only a slight increase in frequency, due to the new exploration carried out, occurred from 1988 (Catalisano et al., 1989) to 1993.

The Fat dormouse is present in the northern ridge of Sicily, from the Peloritani mountains to the Madonie range, throughout the Nebrodi and Etna ranges. It lives mainly in deciduous temperate forests between 800 and 1800 m above sea level:

namely in beech forests of the colchian and subatlantic belt and in deciduous oak woods of the samnitic belt. The beech formations belong to the *Aquifolio-Fagetum* Pignatti (1979) in the Nebrodi range and to the *Anthrisco-Fagetum* Hofmann (1965) in the Madonie. The oak formations are mostly composed of turkey oak (*Quercus cerris*) or pubescent oak (*Q. pubescens)* mixed, mainly in the Nebrodi area, with chestnut and hazel. It is also present, though more rare, on the warmer slopes (600-800 m) where the hazel and chestnut are intermingled with orchards, olive groves and sometimes evergreen oaks (*Q. ilex* and *Q. Suber*).

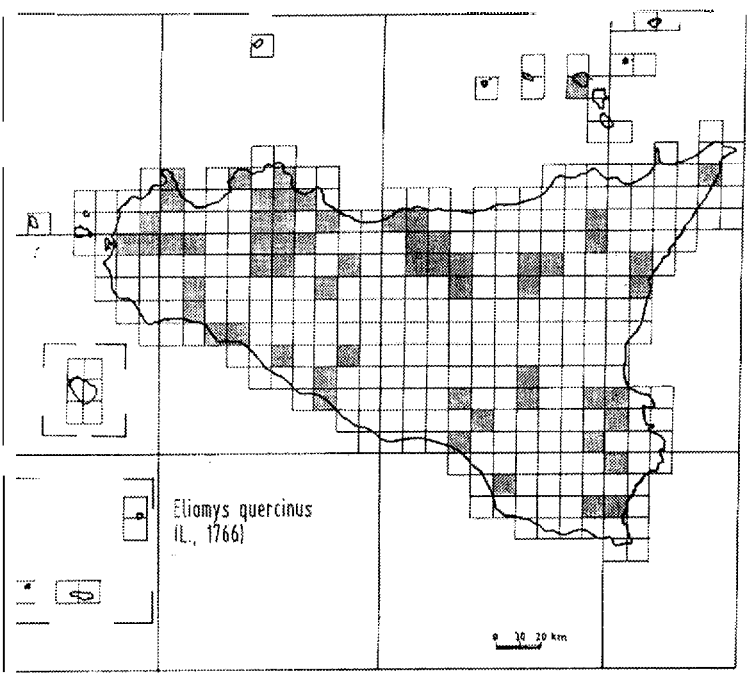

Fig. 1 – Distribution of **the** Garden dormouse in Sicily.

In the Madonie mountains it lives in the mixed oak formation in the area of Gibilmanna around 1000 m. In october 1992, a dead animal was found in a mature evergreen oak wood (*Q. ilex)* around 1100 m at Piano Zucchi. No other information is available about its distribution in the beech forests from this area.

In the Etna area it has been observed both on the eastern and the western side of the volcano in mixed pine-oak woods (*Pinus laricius*), and in hazel groves from 1100 m to 1600 m a.s.l.

Away from the northern ridge it was found by Amori et al. (1986) only in a south-eastern area (Iblei) of the mediterranean arid vegetational belt at 400-500 m a.s.l.

The Fat dormouse is also present on the island of Salina in the Eolian archipelago (max altitude 960 m a.s.l.). In this island it has been observed (Zava pers. com.) in the densest chestnut stands. Cristaldi & Amori (1988) argued that

both the Fat dormouse and the chestnut were introduced there during Roman times, for culinary purposes.

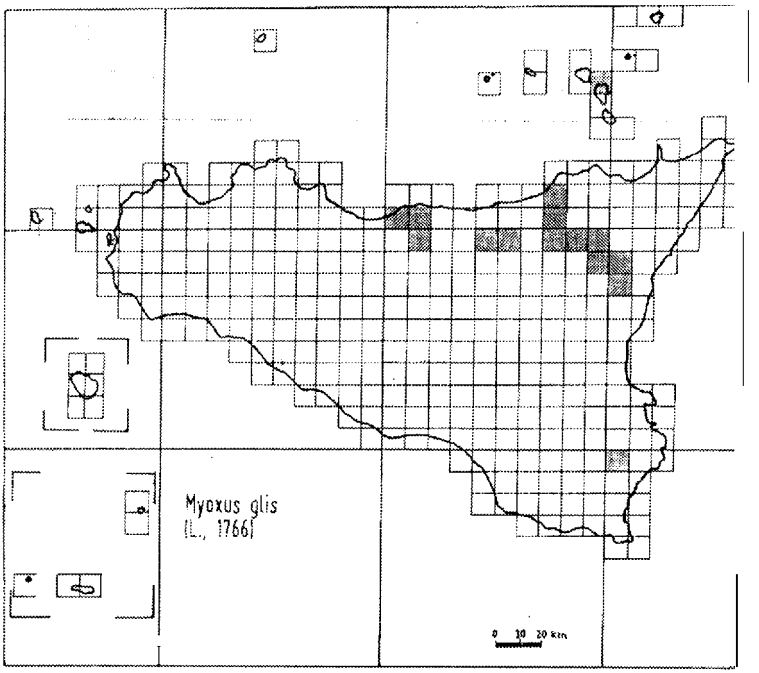

Fig. 2 – Distribution of the Fat Dormouse in Sicily.

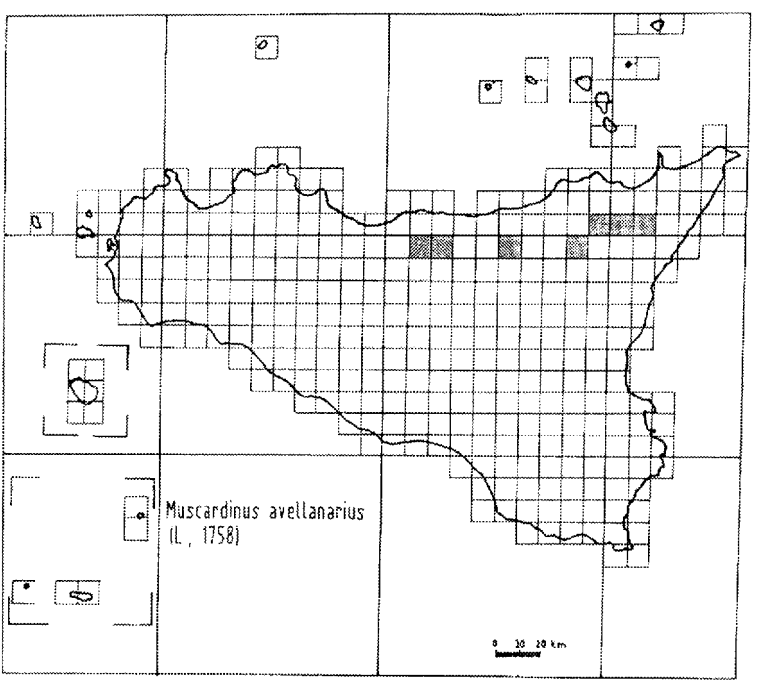

Fig. 3 – Distribution of the Hazel Dormouse in Sicily.

Tab. 1 – Number and frequency (%) of 10 x10 km squares, where dormice were found in Sicily and surroundings islands; above = data till Dcccniber 1988 (Catalisano et al. 1989) below in bold = data till May 1993 (present study).

	SICILY		SICILIAN ARCHIPELAGOS	
	N° IJTM squares	% (n = 283)	N° IJTM squares	% (n = 14)
E quercinus	52	18.4	1	7.1
	60	**21,2**	**1**	**7,1**
U glis	15	5,3	1	7,1
	15	**5,3**	**1**	**7,1**
M. avellanarius	5	1,8	0	0
	7	**2,1**	**0**	**0**

Tab. 2 – Percentage of Dormice in the prey of Owls in different habitats of Sicily.

Tyto alba	CEREAL FIELDS	CEREAL FIELDS	CEREAL FIELDS	OAK-WOODS	OAK-WOODS	WETLANDS	SUBURBAN	OLIVE GROVES
	Mid-Western Sicily	Western Sicily	Eastern Sicily	Western Sicily	Eastern Sicily	Eastern Sicily	Wcstcrn Sicily	Mid-Western Sicily
Myoxus glis	0	0	0	0	0	0	*0*	*0*
M. avellanarius	*0*	0	0	0	1,4	0	*0*	*0*
E. quercinus	*0*	0,04	*0*	0	0,3	0	tr	0
% MAMMALS	93.6	63.9	99	75,5	96.3	100	89.9	87
N OF PREY ITEMS	3194	20158	212	1778	7,4	650	466	230

Strix aluco	ROCKY-DRY AREAS	OAK-WOODS	ECOTONES	BEECH FOREST	BEECH FOREST	PINE-OAK-WOODS	SUBURBAN
	Western Sicily	Western Sicily	Eastern Sicily	North-Eastern Sicily	Mid-Northern Sicily	Eastern Sicily	Wcstcrn Sicily
Myoxus glis	0	0	0	5,3	0	5,1	0
M. avellanarius	0	0	1,5	1	1,1	*0*	*0*
E. quercinus	0,6	0,4	*0*	0	0	0	0
% MAMMALS	62,4	60,4	66.7	62,6	58,2	61	66.1
N OF PREY ITEMS	351	737	537	206	189	59	322

The Hazel dormouse is the rarest species and is found only in some localities in the northern ridge and in the Etna. In these areas it is sympatric with the Fat dormouse. Both dormice live in the same deciduous temperate forests, in the subatlantic and in the samnitic belt, where the former has been recorded up to 1600 m. It is also present at lower altitudes (500-800 m) on the warmer slopes of the river valleys (the so-called fiumare) of Nebrodi and Peloritani, in mixed hazel and chestnut stands.

The Garden dormouse has the widest distribution and is widespread in a variety of habitats ranging from sea level up to 1600 m a.s.l. It occupies both the sclerophyll and the deciduous biomes, ranging from the mediterranean arid *(Oleo-Ceratonion)*, normally cultivated areas, to the subatlantic vegetational belt, but in the latter formation it has been, so far, recorded only on the Madonie range (*Anthrisco-Fagetum*). It lives even in arid rocky habitats (e.g. Penisola di S. Vito lo Capo, Monte Cane, etc.) where the sclerophyll vegetation is very scattered, degraded or completely absent. It was observed even in artificial woods *(Eucalyptus* spp.) and in pine stands (*Pinus halepensis)* at sea level (Foce del Belice and Pineta di Vittoria).

PREDATION

The dormice are infrequently preyed upon by Vipers, diurnal and nocturnal Raptors and Carnivores in peninsular Italy and Europe (Schauenberg, 1981; Bertolino & Dore, 1991; Contoli et al., 1991; Capula & Luiselli, 1990).

A complete estimation of the predation on dormice in Sicily is not yet possible due to lack of information about the trophic niche of the Marten (*Martes martes*), the Wild Cat (*Felis silvestris*) and the Viper (*Vipera aspis*).

Among the other species, whose diet has been studied in Sicily, only four were found to prey on dormice. Fais et al. (1991) reported a single case of predation upon the Garden dormouse by the Red Fox (*Vulpes vulpes*), out of 539 faeces (0.19%) analized from different locations. Massa (1981) found no dormice in the diet of 14 species of diurnal and nocturnal raptors.

However in another study (Massa, 1991) two Garden dormice were found among the prey of the Lanner Falcon (*Falco biarmicus*), representing 5,7% of the mammals taken (0,23% of the total prey items).

Subsequent studies on the trophic ecology of owl species (Sara, 1990 and references therein) showed that only two (Tawny Owl, *Strix aluco* and Barn Owl, *Tyto alba*) prey upon dormice (Table 2).

The Barn Owl occasionally takes the Garden dormouse, which is the only species that generally overlaps its habitat, and **in** the Nebrodi oak woods it preys also on the Hazel dormouse. The low percentages of predation can be due to its rarity in these habitats.

Dormice are slightly more represented in the diet of the Tawny Owl, the Fat dormouse being the species most often taken (5%) in the Nebrodi and in the Etna ranges. However, it is necessary to emphasize that the Fat dormouse represents 47% of the total biomass consumed by the Tawny Owl in these areas. During summer and fall, it is even ranked as the first species **in** order of importance among various preys.

ACTIVITY

The occurrence of specimens recovered in fresh pellets and the field and trapping observations allow a preliminary description of the annual activity of dormice (Table **3).** Hibernation of the Garden dormouse, is reduced or is intermittent in the mediterranean climate; where this species can also breed twice a year (Moreno, 1988).

Tab. 3 – Activity of dormice in Sicily according to month. **A** = remains in fresh pellets; B = direct observations, museum specimen labels: C = live-trapped at 1600 m a.s.l.; abs = not trapped at 1600 m a.s.l.; Each symbol **(x)** refers to a single record of presence in categories A, B and C.

MONTH	*E. quercinus*			*M. glis*			*M. avellanarius*		
	A	B	C	A	B	C	A	B	C
SAN	xx						x		
FEB	xxx		abs						
MAR	x								
APR	x								
MAY	x						x		
SUN	x						x		
JUL	x			x	xx		x		
AUG	xxx	xx	x	x	xx		xx		
SEP	x	x	x	xx	xx		xx		
OCT	x	x	abs	xx	x		xx		
NOV			abs						
DEC									

On the basis of these preliminary data, it is possible that hibernation occurs only at higher altitudes (800-1800 m) in Sicily. In these montane areas all the Fat dormouse records are concentrated in July and October. The other two species occur in pellets throughout the year, but all the available records during the cold season (November-March) generally came from low altitudes (0-500 m a.s.l.) and coastal habitats. At higher altitudes (1600 m) the Garden dormouse has been trapped only from June to September.

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