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NEST-BOX OCCUPATION BY THE DORMOUSE *MUSCARDINUS AVELLANARIUS* L. *(RODENTIA,MYOXZDAE).*

ALBERTO SORACE (*+), FABRIZIO PETRASSI (*), FEDERICA TANDA (*), GIUSEPPE LANDUCCI (*°) AND PIERFRANCO RUDA (*°).

(*) S.R.O.P.U., c/o Via R.Crippa 60, D/8, 00125 Roma (Acilia).
(+) Laboratorio di Medicina Veterinaria, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Roma.
(°) Tenuta Presidenziale di Castelporziano, Via Pontina, Roma.

ABSTRACT – The following paper contains data on nest-box occupation by the dormouse in four habitats of the Presidential estate of Castelporziano. Dormouse has been observed inside the nest-boxes in all months of the year and active animals have been repeatedly observed during the winter. These results concord with suggestions that in the Mediterranean area the species occupies nest-boxes also in winter and that it has different yearly rhythms of activity than in northern areas. Except in pine woods, the dormouse was found in nest-boxes of all study habitats. Some results seem to show that competition with hole-nesting passerines heavily affects spring occupation by the dormouse. In spring the Dormouse prefers 'old' nest-boxes. 'new' nest-boxes (i.e. at the first year of placement in a habitat or in a new area) are occupied at higher extent from the autumn onwards. Yearly variation in occupation percentages of nest-boxes by the dormouse were also observed.

Key words: *Muscardinus avellanarius*, nest-boxes, seasonal occupation.

INTRODUCTION

Populations of the Dormouse *Muscardinus avellanarius* are decreasing in all of Europe (Amori and Zima. 1994) and nest-box use could be a useful tool for the conservation of this species (Bright and Morris, 1990, 1994). Indeed in an area with a sufficiently large availability of nest-boxes, almost the whole population of the dormouse will use them (Bright and Morris. 1992).In fact the species was observed occupying the nest-boxes in nearly all the study habitats in nine Italian areas, in some cases also in late autumn and at the end of winter (Sorace et al., 1995). In this paper we report data on nest-box occupation by the dormouse in the presidential estate of Castelporziano, and provide information on three aspects of the biology of this rodent: a) occupation and presence of active animals in winter; b) seasonal rhythms of nest-box occupation and competition with hole nesting passerines; c) choice between nest-boxes either of recent or old installation.

STUDY AREA AND METHODS

Nest-boxes were fixed in four habitats of the Presidential estate of Castelporziano (41" 44' N, 12° 24' E): a) a deciduous wood with *Quercus cerris* and *Quercus frainetto*; b) a pine wood of *Pinus pinea*; c) an evergreen wood of *Quercus ilex*; d) a transitional area between deciduous wood and evergreen wood. The available number of nest-boxes in each habitat for each year is reported in Table 1. **At** the end of winter 1996 and 1997, almost half of the boxes placed in each habitat were moved to a new area of the same habitat. Then we categorised nest-boxes as 'new' or 'old', the

Table I - Spring occupation percentage, of nest-boxes by the dormouse. The available number of nest-boxes is in brackets.

	Spring '91	Spring '92	Spring '93	Spring '94	Spring '95	Spring '96	Spring '97
Deciduous wood	0 (32)	13.3 (30)	23.3 (30)	3.4 (29)	0 (70)	0 (64)	10.3 (58)
Transitional wood				5.0 (40)	14.0 (50)	5.0 (40)	8.3 (36)
Evergreen wood					5.0 (40)	3.0 (37)	24.3 (37)
Pine wood	0 (18)	0 (16)	0 (10)				

former including boxes at the first year of placement in a habitat or in a new area.

Nest boxes (14x14x21 cm, entrance hole diameter 36 mm) were fixed at about a height of 3 m, at a distance of SO m from each other. During the period 1991-1997, from early April to later June the nest-boxes were controlled weekly and were considered to be or have been occupied by a dormouse when either a nest or individual were recorded. Moreover until October 1997 we carried out occasional visits to the nest-boxcc in every month of the year, except in July and August. Visits to boxes were always carried out in diurnal hours.

Results and Discussion

In all months of the year the dormouse was observed inside the nest-boxes and nests of the species occupied by active animals were observed during the winter in each study year (Table 2).

Table 2 - Winter occupation percentages of nest-boxes by the dormouse. Only nest-boxes where animals were present were considered occupied. The available number of nest-boxes is in brackets.

	Winter '94	Winter '95	Winter '96	Winter '97
% occupation	4.3 (69)	10.0 (70)	4.3 (70)	6.1 (66)

Dormice activity during winter in this area is also documented through the analysis of barn owl *Tyto alba* pellets, which shows that the owl preys significantly on the dormouse during the winter season (Ranazzi et al., 1997).

These results concord with Bellavita and Sorace (1994a) and Sorace *et al.* (1994) who suggested that in the Mediterranean area the species occupies nest-boxes also in winter and that it probably has different yearly rhythms of activity from northern areas, where the period from October to May is spent hibernating on the ground (Bright and Morris, 1992).

Except in pine woods, the Dormouse was found in nest-boxes of all the study habitats. However spring occupation percentages were not high (Table 1). This could be because the density of the dormouse is lower than other rodents (Bright and Morris, 1992), or due to the competition with hole nesting passerines or to the peculiar habitat choice of the dormouse (Bright and Morris, 1990, 1992; Bellavita and Sorace, 1994a; Sorace et al., 1994; Berg, 1997).

Some observations seem to confirm the importance of competitive factors. In 27 cases out of 34 (79.4%;χ^2_1=10.6, p<0.01) desertion of a nest-box by the dormouse was followed by occupation of the hole by a nesting passerine. During the spring, in 24 cases out of 32 (81.2%;χ^2_1=7.0, p<0.01) the nest-boxes occupied by the dormouse were abandoned before April 30, when the number of laid clutches by hole nesting passerines is maximum (Bellavita and Sorace, 1994b). Nest-box occupations by hole nesting passerines (*Parus major, Parus caeruleus* and, more rarely, *Troglodites troglodites* and *Sitta europaea*) were always above 60% and competitive factors for the nest-boxes were observed among hole nesting passerines too (Tanda et al. 1997; Petrassi et al. 1998).

In spring the dormouse prefers the 'old' nest-boxes (in 1997, χ^2_1=22.3 p<0.001, as shown in Table 3). The 'new' nest-boxes seem to be occupied to a higher extent from the autumn onwards (comparison spring-autumn, summing data of all the years, χ^2_1=8.7 p<0.01). Therefore, some individuals of the dormouse, among which there may be newborns (Juškaitis 1997), start to occupy new sites in autumn and possibly in summer. They occupy them apparently for all the winter, until the early spring when, due to the competition with hole nesting passerines, they are forced to desert them.

Table 3 - Spring occupation percentages of 'new' and 'old' nest-boxes by the dormouse. The available number of nest-boxes is in brackets

	Deciduous wood		Transitional wood		Evergreen wood	
	new	old	new	old	new	old
Spring '91	0 (32)					
Spring '92		13.3 (30)				
Spring '93		23.3(30)				
Spring '94		3.4 (29)	5.0 (40)			
Spring '95	0 (40)	0 (29)	10.0 (10)	15.0 (40)	5.0 (40)	
Spring '96	0 (36)	0 (28)	0 (18)	9.1 (22)	0 (19)	5.6 (18)
Spring '97	0 (30)	21.4 (28)	0 (18)	17.5 (18)	0 (18)	47.3 (19)

Yearly variation in the occupation percentages of nest-boxes by the dormouse are presented in tables 1 and 3. In the case of the almost **30** nest-boxes present in the same area from 1991 to 1996, the differences were significant (χ^2_4=16.1. p<0.01; data 1992-1996). These results do not seem in relation to variations in the occupation percentages of hole nesting passerines (unpublished data). but could be caused by numerical fluctations of the species (Bright and Morris 1994).

In conclusion our results confirm the effectiveness of nest-box placement for the dormouse, but they also indicate that the nest-boxes should have special features which stop spring bird occupation (Bright and Morris, 1990) and that a yearly displacement of some nest-boxes present in an area can promote the dormouse's occupation in autumn and winter.

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