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DISTRIBUTION AND ECOLOGICAL REQUIREMENTS OF DORMOUSE SPECIES OCCURRING IN HUNGARY

BOTOND BAKÓ[1], GÁBOR CSORBA[2] & LÁSZLÓ BERTY[3]

[1]Department of Zoology and Ecology, Gödöllô University of Agricultural Sciences, H-2103 Gödöllô, Páter K. u. 1

[2]Department of Zoology, Hungarian Natural History Museum, H-1088 Budapest, Baross u. 13.

[3]Natural Sciences Foundation, H-2131 Göd, Körös u. 15.

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The distribution of three Hungarian dormouse species (*Muscardinus avellanarius, Myoxus glis, Dryomys nitedula*) is shown. The authors compare their data with maps of natural vegetation of Hungary, and indicate the original habitat requirements for each species. According to this, the most common and most adaptive species is *Muscardinus avellanarius*.

The authors also examined human affected habitats using live-traps at 12 sites in the country during 1995 and 1996. The hazel dormouse provided the largest number of captures, natural habitats were mostly inhabited by the fat dormouse and the forest dormouse was the rarest in traps and occurred in human affected habitats only.

Key words: Myoxidae, Hungary, habitat preference, distribution

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U radu je prikazana rasprostranjenost triju mađarskih vrsta puhova (*Muscardinus avellanarius, Myoxus glis, Dryomys nitedula*). Autori uspoređuju vlastite podatke s kartama prirodne vegetacije Mađarske i za svaku vrstu opisuju izvorna staništa. Proizlazi da je najčešća i najprilagodljivija vrsta *Muscardinus avellanarius*.

Autori su također istraživali staništa izložena utjecaju čovjeka primjenom živolovki na 12 različitih mjesta u zemlji tijekom 1995. i 1996. godine. Najčešće je ulovljen puh orašar, prirodna staništa je uglavnom nastanjivao sivi puh, a najrjeđi je u klopkama bio gorski puh koji se pojavljivao samo na staništima na koje je utjecao čovjek.

Ključne riječi: Myoxidae, Mađarska, izbor staništa, rasprostranjenost

Hrvatski prirodoslovni muzej, Demetrova 1, Zagreb, Croatia

INTRODUCTION

There are three species of the Myoxidae family (Rodentia) in Hungary: *Muscardinus avellanarius*, *Myoxus glis* and *Dryomys nitedula*. The only evidence of the occurrence of garden dormouse (*Eliomys quercinus*) in Hungary is a skull from the pellet of tawny owl found in the Aggtelek National Park (KORDOS 1975), unconfirmed since. No comprehensive study of dormice has been prepared in Hungary, only faunistical data appearing in the zoological literature. The first dormouse data for the whole country were published by SCHMIDT (1974). Subsequently, a number of authors provided distributional data as a by-product of pellet analyses (ANDRÉSI 1983, ÁCS 1984, HARASZTY 1984, 1989, KALOTÁS 1985, 1986, 1989, KÖVES & SCHMIDT 1990, MÁTICS 1990, SCHMIDT 1975). The Hungarian data in the paper of KRYSTUFEK & VOHRALIK (1994) on the European distribution of forest dormice are based on PASZLAVSZKY (1918) and the database of the Hungarian Natural History Museum.

The Department of Zoology and Ecology, Gödöllô University of Agricultural Sciences started the first dormouse research in 1995, concentrating on morphology, distribution, habitat preference and population biology.

MATERIALS AND METHODS

Preliminary distribution maps of three species (Fig 1–3) were based on files and specimen labels of the Mammal Collection in the Hungarian Natural History Museum, together with distribution and owl-pellet data published in the literature. They were completed by our own field data. Localities are depicted on UTM maps using a 10 × 10 km grid.

To examine »blank spots« and areas with vegetation altered by man we trapped in 12 localities throughout the country beginning in August 1995. We chose locations of different landscape and vegetation. Several of the areas tested were inhabited by two or three dormouse species. According to current laws of nature conservation we used exclusively live-traps (Fig. 4). Traps were fixed on the branches of trees and bushes, approximately 2–3 meters above ground. We used fruits of the season as bait (cantaloup, strawberry, apple, peach, pear, plum, grape etc.). Between 40 and 200 traps used; they were checked twice a night and we spent at least three nights in the same area.

The following morphological data of the captured animals were recorded in the field: body length (from tip of nose to base of tail), tail length (from base to end of tail vertebrae), length of hind foot (from proximal part of calcaneum to tip of longest toe of left hind limb, not including the claw (slight pressure on the Achilles-tendon makes the animal stretch its foot, and it is this length that is recorded), ear length (from tip of the ear to lowermost point of the ear-hole) (Table 1.). To measure body weight we put the animal into a canvas bag made especially for this purpose.

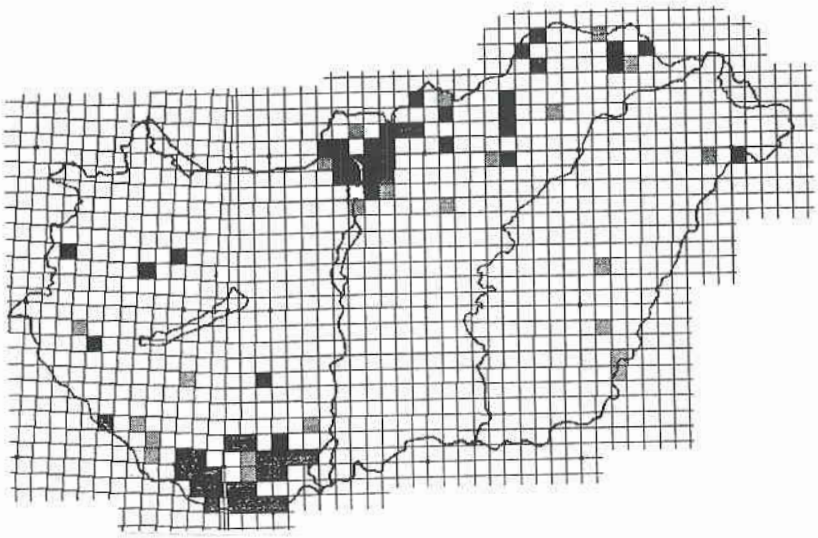

Fig. 1. The distribution of the hazel dormouse (*Muscardinus avellanarius*) in Hungary. Grey squares = data collected before 1970, black squares = data collected since 1970.

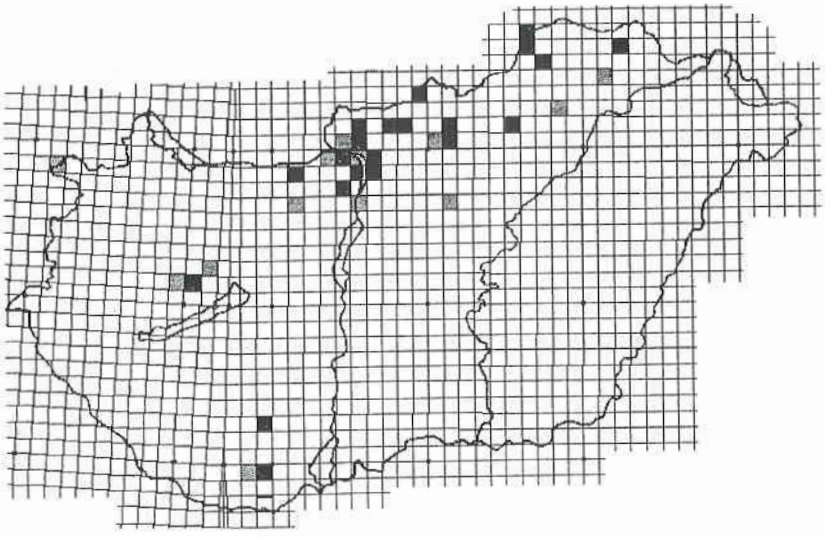

Fig. 2. The distribution of the fat dormouse (*Myoxus glis*) in Hungary. Grey squares = data collected before 1970, black squares = data collected since 1970.

Adults and juveniles were distinguished by body weight and development of gonads. Animals were marked by cutting the distal digit of the toe according to a code system.

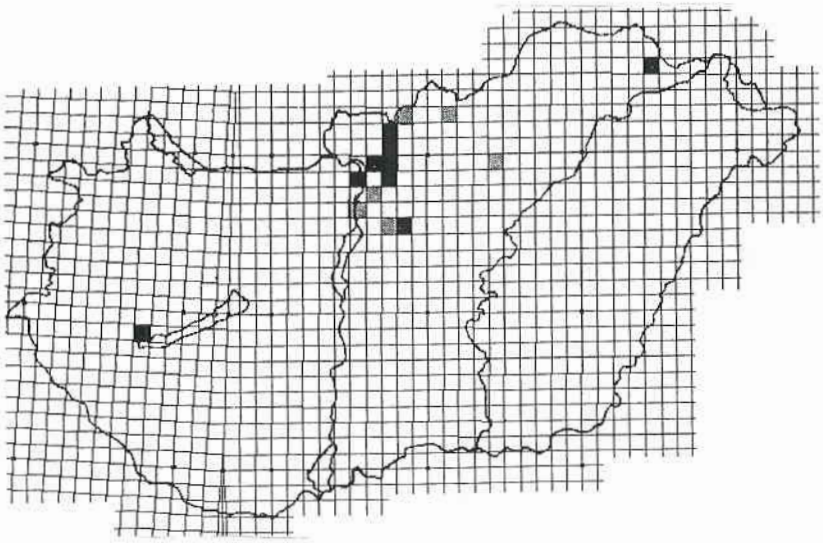

Fig. 3. The distribution of the forest dormouse (*Dryomys nitedula*) in Hungary. Grey squares = data collected before 1970, black squares = data collected since 1970.

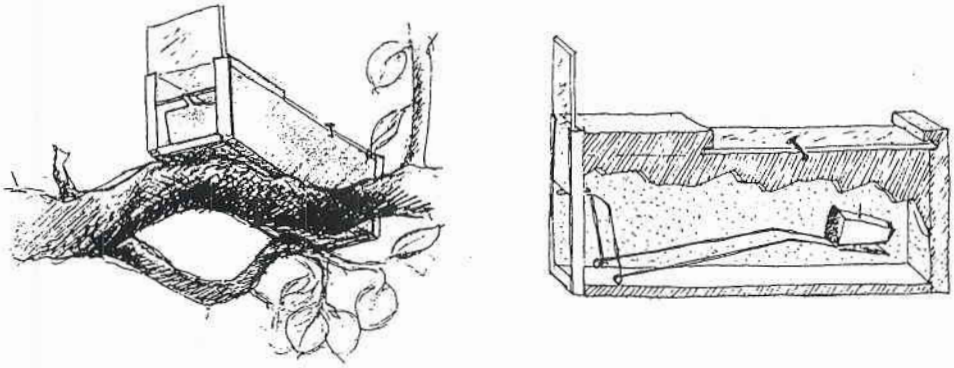

Fig. 4. The setting (top) and cross-section (bottom) of the live-trap used.

RESULTS

We compared our distribution maps of dormouse species to maps of original natural vegetation (ZÓLYOMI 1989), in order to reveal the original vegetation requirements of each species in Hungary. The data of our distribution maps are incomplete, but are suitable for describing the main relief and vegetation features of the original habitats of Hungarian dormice.

Table 1. External measurements of adult specimens of different dormouse species (in mm). Sample sizes are in parentheses.

	Body length	Tail length	Ear length	Length of hind foot
Muscardinus avellanarius female (52)	64–89	61–74	8–13	15–17.6
male (74)	65–86	62–86	8–14	15–19.9
Myoxus glis female (20)	123–160	108–121	16–19	26–28.7
male (46)	125–168	100–145	13.8–18.6	22.4–29.5
Dryomys nitedula female (11)	92–100	78–86	9.9–13	19–20.5
male (17)	82–100	77–82	11–14.5	20–22.6

Within the boundaries of Hungary the biggest populations of hazel dormouse (*Muscardinus avellanarius*) are found in mountains of medium height (300–1000 m a.s.l). They occupy most of the forests of the Transdanubian and Northern Ranges, but are present in lower (150–200 m asl.) hilly habitats as well (UTM code: XM, YM, BS). Hazel dormouse populations of lowland areas are sparse. In the Northern Range they prefer sessile oak-turkey oak forests (*Quercetum petraeae-cerris*), while in higher areas they are found in montane oak-hornbeam forests (*Querco petraeae-Carpinetum*) and shrub layers of submontane beech forests (*Melitti-Fagetum*). We have no hazel dormouse data from montane beeches (*Aconito-Fagetum*). It is remarkable that wet bushy habitats and oak-ash-elm forests (*Fraxino pannonicae-Quercetum roboris*) are also suitable for this species. In the Transdanubian Range submontane beeches are also inhabited by hazel dormice, while we have no evidence of their presence in the Illyrian karst forests with pubescent oak (*Omo-Quercetum pubescentis*) found in the southern part of this range. The Illyrian beech (*Helleboro odoro-Fagetum, Vicio oroboidi-Fagetum*) and oak-hornbeam forests of South-western Hungary also serve as a habitat for this species.

The fat dormouse (*Myoxus glis*), which seems to be more selective as regards habitat, is entirely absent from the lowlands (0–300 m). It is mainly restricted to the Transdanubian and Northern Ranges sessile oak-turkey oak forests habitat, but it appears in Illyrian beech and montane beech forests as well. In contrast to the previous species, no significant populations live in Illyrian oak-hornbeam forests (*Helleboro-Carpinetum*).

The rarest, least widespread dormouse species of Hungary is the forest dormouse (*Dryomys nitedula*). Its main range is found in the northern part of the country in the mountains along the Danube river. The habitats of this species in the vicinity of Budapest (PASZLAVSZKY 1918) have already been destroyed. According to earlier data a few populations lived in North-eastern Hungary at the beginning of the century, but we have no recent data. According to vegetation maps forest dormice mainly inhabit sessile oak-turkey oak forests. Unlike the other two species

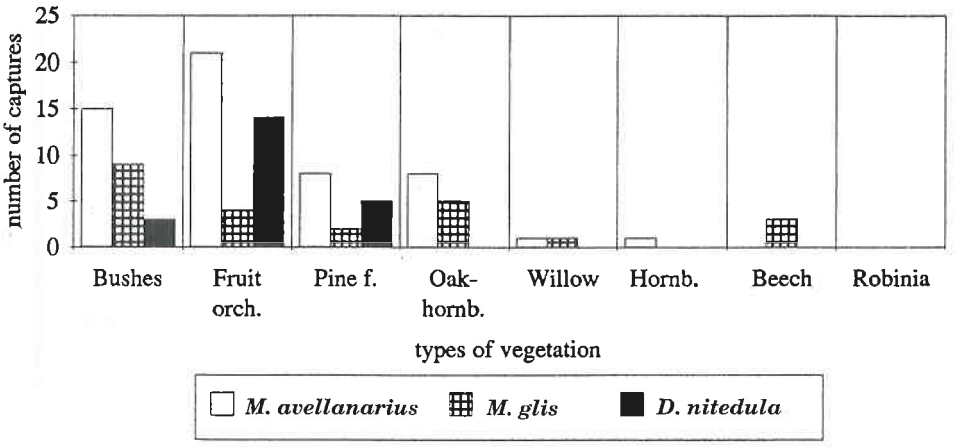

Fig. 5. Number of captures according to vegetation types.

they dwell in drier oak forests (*Ceraso-Querceto pubescentis*) as well. Yet they avoid oak-hornbeam forests, submontane and montane beeches.

To examine preferences in human affected or natural biotopes we used live-traps. From August 1995 to October 1996 we captured 120 animals (66 *Muscardinus avellanarius*, 29 *Myoxus glis* and 25 *Dryomys nitedula*) in our trapping sites.

Human-affected areas were divided into groups according to the types of vegetation: bushes (*Cornus mas, Cornus sanguinea, Prunus spinosus, Prunus domestica, Pyrus pyraster, Rosa sp., Viburnum lantana*), abandoned orchard (*Malus domestica, Prunus domestica, Pyrus communis, Cerasus avium, Armeniaca vulgaris, Persica vulgaris, Juglans regia*), planted Scotch pine forests (*Pinus sylvestris*), black pine plantations (*Pinus nigra*), and black locust forests (*Robinia pseudoacacia*). Natural types of vegetation include beeches, oak- hornbeam forests and oak-ash-elm forests.

The majority of hazel dormice were caught in bushy areas and often in neighbouring orchards (Fig 5). It is worth noting that a relatively large number of specimens were trapped in pine woods and sessile oak-turkey oak forests. We even found some individuals in young, pure hornbeam forest and in riverine willow groves.

Fat dormouse data mainly derive from bushes, too. In orchards they usually fell into traps on trees. This species is the rarest in pine forests, while it is the only species present among beeches. The largest part of forest dormouse data derive from fruit trees and the edges of pine forests. In bushes, this species is the rarest. In other habitats, we have not found them in traps. In the non-indigenous black locust forest we could not find any of the species.

DISCUSSION

Most of Hungary's natural vegetation has recently been transformed by secondary man-made habitats. There are different degrees of adaptation of dormouse species to the altered conditions. Planted, non-native pine woods serve as habitats for dormouse species, just like fruit orchards, which provide seasonal food basis for the animals. However, they are absent in the non-indigenous black locust forests with scarce shrub-layer.

The most adaptable species is the hazel dormouse. We have a relatively large amount of trapping data from pine forests and their surroundings, where their food is presumably the fruit of bushes, wild apple and pear trees most of the year. We have not found any evidence of cone gnawing. Vegetation with more cover may be significant as protection against predators (BERG 1996); bushes and hedges were the site of many captures. Oak-hornbeam forests are inhabited by dormice mostly in the time of acorn ripening, however we captured animals in pure hornbeam forest, too. It is worth mentioning that in this forest the lack of lower foliage-layer made animals move in the canopy 15–20 m above ground. The fat dormouse was mostly found in bushy areas, but in smaller numbers. In forests with a natural character this species was the most frequently captured one, showing the species' preference for original vegetation. Our forest dormouse captures were mainly from areas with secondary vegetation, usually abandoned orchards.

It should be mentioned, that the number of males captured, in the case of all three species, was higher than that of females.

We trapped only a few specimens of dormice in June, all of them being males. Since they consume insects at this time (HOLISOVA 1968, BRIGHT & MORRIS 1992) our fruit baits did not lure them into the traps. The number of captures in July showed a steep rise, presumably due to a gradual turn to fruit consumption, and because the first litters are becoming independent. The maximum amount of captures was reached in August. In September daily activity starts to be affected by weather: in cold and wet nights no movement was recorded. The decrease of temperature itself does not affect the activity of the animals. In October, when most populations have gone to winter hibernation, we did not find any females in the traps.

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SUMMARY

Distribution and ecological requirements of dormouse species occurring in Hungary

Botond Bakó, Gábor Csorba & László Berty

Based on literature data, collections and live-trappings, we prepared 10x10 grid UTM maps of the distribution of Hungary's dormouse species (*Muscardinus avellanarius, Myoxus glis, Dryomys nitedula*). We compared these data with maps of natural vegetation of Hungary, thus being able to indicate the original habitat requirements for each species. According to this, the most common and the most adaptive species is *Muscardinus avellanarius.*

To examine human affected habitats, we used live-traps at 12 sites in the country during 1995 and 1996. The hazel dormouse provided the largest number of captures, mainly in orchards, though they occurred in planted pine forests, too. The fat dormouse was also found in these habitats. Natural habitats were mostly inhabited by this species. The forest dormouse has proved to be the rarest in traps and occurred in human affected habitats only.

SAŽETAK

Rasprostranjenost i ekološke potrebe vrsta puhova koje žive u Mađarskoj

Botond Bakó, Gábor Csorba & László Berty

Na temelju literaturnih podataka, zbirki i lova živolovkama, pripremili smo UTM karte (10x10) rasprostranjenja mađarskih vrsta puhova species (*Muscardinus avellanarius, Myoxus glis, Dryomys nitedula*). Usporedili smo te podatke s kartama prirodne vegetacije Mađarske, i tako smo mogli ukazati na izvorna staništa svake vrste. Proizlazi da je najčešća i najprilagodljivija vrsta *Muscardinus avellanarius.*

Da bismo istražili staništa izložena utjecaju čovjeka, primijenili smo lov živolovkama na 12 različitih mjesta u zemlji, tijekom 1995. i 1996. godine. Najveći broj ulova zabilježen je za puha orašara, uglavnom u voćnjacima, iako ga je bilo i u sađenim borovim šumama. Sivi puh je, također, nađen u tim staništima. Prirodna staništa većinom je nastavala ta vrsta. Gorski puh je bio najrjeđi u klopkama i pojavljivao se samo na staništima na koje je utjecao čovjek.