Najwyżej położone stanowiska orzesznicy stwierdzono w Macedonii (1980 m n.p.m.; Kryštufek i Petkowski 1990), w Alpach austriackich (1920 m n.p.m.; Spitzenberger i Bauer 2001) i w Tatrach słowackich (do 1900 m n.p.m.; Anděra 1987). W Polsce najwyższej odnotowano orzesznicę w Tatrach – na Uhrociu Kasprowym 1750 m n.p.m. (Ważna i in. 2012).

Występowanie i rozmieszczenie w Polsce

Przed rokiem 1980 orzesznica leszczynowa, jak się wydaje, znana była głównie w południowej i wschodniej Polsce oraz na izolowanych stanowiskach na wybrzeżu i wzdłuż granicy z Obwodem Kaliningradzkim (Królewieckim) Rosji, a nie była obecna w Polsce zachodniej i centralnej, na Pomorzu i na Mazurach (Pucek 1983, ryc. 4A). Obecnie orzesznica występuje zwartym zasięgiem od Sudetów i Przedgórza Sudeckiego przez Karpaty i Pogórze Karpackie po Wyżynę Lubelską (ryc. 4B). Bardziej rozproszone stanowiska pochodzą z Wyżyny Małopolskiej, Niziny Mazowieckiej i Podlasia oraz z północnej i wschodniej części Pojezierza Mazurskiego (Jurczyszyn i Wołk 1998). Nowe stanowisko odnotowano również na Wysoczyźnie Elbląskiej oraz w okolicy Ełka i Olecka (Zagrodzki 2023; Bujnowski 2024) W centralnej i północno-zachodniej Polsce odnotowano jedynie pojedyncze stanowiska tego gryzonia. W Wielkopolsce znana jest z Parku Krajobrazowego Promno (Kałuża 1987; Czapracka i in. 2010) oraz w powiecie ostrowskim w wielkopolskiej części PK „Dolina Baryczy (Ekiert 2006). Z ostatnich 20 lat brakuje stwierdzeń dla Pobrzeża Bałtyku. Ostatnio więcej stwierdzeń pochodzi z Sudetów, a stosunkowo dużo nowych stanowisk odkryto w Lasach Lublinieckich oraz w Stobrawskim Parku Krajobrazowym na Górnym Śląsku (Hebda i in. 2024, K. Belik – dane niepubl.). Przyczyn braku orzesznic w centralnej i lokalnie w północno-zachodniej części naszego kraju Jurczyszyn i Wołk (1998) dopatrują się w intensywnych odlesieniach prowadzonych w przeszłości na tych obszarach.

Summary

Common dormouse *Muscardinus avellanarius* is the most common dormice Gliridae in Poland. According to more recent genetic studies, the dormouse population consists of at least five historically isolated subpopulations evolving independently of each other (Mouton et al. 2012). Storch (1978) distinguished, according to the state of knowledge at the time, three subspecies: *Muscardinus a. avellanarius*, *M. a. speciosus*, and *M. a. zeus*. The nominative subspecies (Fig. 1) inhabits almost all of Europe, *M. a. speciosus* lives in central and southern Italy, and *M. a. zeus* – in Greece. The main features of subspecies separation in Europe are fur coloration and dental characteristics (Schlund 2005). Two further subspecies (*M. a. trapezius* and *M. a. abanticus*) were distinguished in Turkish Anatolia (Kryštufek & Vohralík 2005; Juškaitis & Büchner 2010) (Fig. 2).

The dormouse is a mouse-sized rodent. Its tail, slightly shorter than the body, is covered fairly evenly with short, fluffy hair along its entire length. Bulging black eyes and small, rounded ears protrude slightly on the sides of the head. The whiskers are black and up to 28–32 mm long. Body dimensions in a sample of 70 Polish individuals were: body length 61–85 mm, tail length 58–77 mm, and ear length 9–14 mm. Body weight ranges from 9–23 g (Sidorowicz 1959; Buchalczyk & Markowski 1979 after Kowalski & Pucek 1984). The average body weight of adult individuals from Wielkopolska (Greater Poland) was 17.78 g, with values ranging from 13.25–23.5 g (Czapracka et al. 2010). Before hibernation, most adults increase their body weight to 25–40 g, with the exception of juveniles born in late summer and autumn, which reach 18–28 g. The largest weight (43.5 g) was achieved by an adult male recorded in October in Dorset, England (Eden & Eden 2001). Animals reach their maximum body length at the age of 2 or 4. In spring, after hibernation, body weight is lower, ranging between 15.0 g and 27.5 g in adults and 12–16 g in juveniles (Lozan 1970; Anděra 1987; Bright & Morris 1992; Juškaitis & Büchner 2010). In Mediterranean countries, dormouse do not hibernate for the winter, and their body weight is quite stable throughout the year (Sará et al. 2001). According to Białas et al. (1989), mountain populations in Poland are slightly larger than those inhabiting the lowlands, and some skull dimensions (zygomatic width, diastema length, and mandible length) were statistically larger in adult females from the Gorce Mountains than in adult males. The same authors found that adult males have feet approximately 1.2 mm longer than females.

The skull of the dormouse has a narrow rostrum and a rounded occipital region (Fig. 3). The condylobasal length of the skull ranges from 19.2 to 22.7 mm (n = 65; Kowalski & Pucek 1984). Most skull dimensions (e.g., condylobasal length, diastema length, zygomatic width, and mandibular height) increase with age (Anděra 1987). The angular process of the mandible has an oval-shaped foramen (Jenrich et al. 2010). The number of permanent teeth is 20, and the dental formula is as follows:

1 0 1 3
1 0 1 3

(Kowalski & Pucek 1984; Schlund 2005). Some tooth features indicate a specialization for plant feeding – they are adapted especially for grinding food. Compared to other dormice species, the dormouse has the longest rows of teeth, constituting almost 20% of the skull length (Juškaitis & Büchner 2010).

The skeletal structure of the dormouse indicates remarkable adaptation to life in shrubs and trees and for movement along branches. Its legs are specialized and adapted for climbing (Juškaitis & Büchner 2010). Telemetry studies have shown that during its active period, individuals spend almost the entire active life above ground – among trees and shrubs – and only 5% of their above-ground time (Müller-Stiess 1996). When climbing, it uses its tail for balance and support.

The active period is nocturnal – from sunset to sunrise. During the day, it rarely emerges from hiding. From late September or early October to April (in our conditions), it hibernates. In this state of torpor, combined with a significant decrease in metabolism and a drop in body temperature, the animal can survive a long winter when temperatures are low and food is scarce (Bright & Morris 2005). The heart rate slows down to 6–13 beats per minute (Airapetyanc 1983). The length of hibernation depends on the latitude, sex, and age of the animals. Adult males awaken from sleep about two weeks earlier than females. In addition to the winter hibernation period, dormouse also exhibit diurnal torpor, which occurs from spring to late autumn, most often when the ambient temperature is 14–15°C (Juškaitis & Büchner 2010). This state of torpor, combined with a periodic, significant drop in body temperature, allows the animals to reduce energy expenditure during periods of unfavorable weather conditions and food shortages.

During winter hibernation, body temperature drops from 37°C to the ambient temperature. However, it cannot drop below 0°C, as otherwise the animals would freeze to death (Eisentraut 1956). During prolonged periods of low temperatures, during which the ground freezes, many dormice die during hibernation. In animals kept outdoors, short interruptions in hibernation have been observed on several occasions (Schlund 2005).

Dormouse individuals are divided into two age groups: juveniles – from birth to their first hibernation, and adults – after

their first hibernation (at which time the animals typically reach sexual maturity). The maximum natural age is 3 to 4 years, rarely 5 or 6 years (Storch 1978; Juškaitis 1999; Schlund 2005).

Compared to other rodents of similar size, dormice are characterized by a relatively low reproductive potential. The reproductive period, the time from the first copulation to the independence of the young from the last litter, extends throughout the dormice's active life phase. The first copulation can occur while the animals are still in their winter shelters (Lozan 1970). Most pairs mate in May. One male can mate with several females, but a female can also allow several males to mate with her, and the young from one litter can have different fathers (Juškaitis & Büchner 2010). Gestation lasts 22 to 26 days. Only females raise the young. In the lowlands (Lithuania), newborns are seen from mid-May, and in the mountains – in late May or the first half of June. The latest births occur at the northern limits of their range: in the second half of August and September (Möckel 1988; Juškaitis 1997). In Germany, during a mild autumn, the last young were born on October 21st, and in England, naked young, just a few days old, were observed as late as December 19th.

It is believed that dormouse dormice reach sexual maturity after their first hibernation – at the age of 10–11 months (Lozan 1970; Schlund 2005). However, in Lithuania, 16.4% of litters came from 2–2.5-month-old females that had not yet hibernated (Juškaitis 2008; Juškaitis & Büchner 2010). Due to the long hibernation, the dormouse's reproductive period is quite short, and only early-born females have a chance to breed in the same year. It has been documented that a certain fraction of females (9–20% in Lithuania and up to 37% in Romania) give birth twice during the season. Occasionally, some of them give birth to up to three litters.

The proportion of reproductive females in the population is variable and can range from 24 to 94% annually, and is higher at low spring population densities. Each litter contains (1) 3–6 (9) young. In the Kampinos Forest (near Warsaw), litters of 1–5 young were recorded, averaging 3.55 (n = 33; Sidorowicz 1959). In Promno Landscape Park, the average number of young per litter was 3.83 (3×3, 1×4, and 2×5 young) (Czapracka et al. 2010). In Lithuania, annual litter sizes ranged between 3.4 and 4.6 young (Juškaitis 2008). The young are born naked and blind. Their average body weight is 1.1 g (range: 0.9–1.5 g). At 13 days of age, the young are gray-furred, and at 14–15 days of age, their ears open and their upper incisors emerge. After 20–25 days, they can leave the nest with the female, and they become independent at 40 days of age (Storch 1978; Juškaitis & Büchner 2010).

Like other species of the Gliridae family, dormouse lack a long cecum (Storch 1978), which limits their feeding on foods high in cellulose due to the inability to digest it. It focuses on obtaining food with a higher energy value, preferring generative plant parts-flower buds, flowers, berries, and seeds – while less readily consuming vegetative parts (leaf buds, leaves, and shoots). In spring, after waking up, its preferred food is hawthorn, cherry, and oak blossoms. In summer, it favors blackberry flowers and fruit, raspberry, buckthorn, and hazelnut fruit, as well as insect – caterpillars and aphids. In autumn, it prefers the fruits of trees and shrubs with high nutritional and energy value; hazelnuts are a particularly important food source. These nuts are the most important source of fat reserves necessary for hibernation and have the highest caloric value of all European seeds (Grodziński & Sawicka-Kapusta 1977). It is known that the caloric value of plant seeds ranges from 15.9 to 31.4 kJ/g of dry matter (n = 95 plant species examined) and is higher the more fat they contain. Hazelnuts are very caloric (30.90 kJ/g dry matter), the edible parts of beech seeds contain 28.639 kJ/g dry matter, and pedunculate oak acorns contain much less – 18.716 kJ/g dry matter. In turn, 1 g of dry matter of rowan fruit contains 26.211 kJ, and apple fruit 26.402 kJ (Dolnik et al. 1982). In late-born young, body weight gain depends on the availability of buckthorn fruit (Juškaitis 2003c). Food of animal origin (insects and their larvae) supplements the diet and may be more important periodically. The hazel dormouse inhabits a wide range of habitats, from old deciduous forests (oak, oak-hornbeam, alder) and mixed forests (oak-pine, pine-hornbeam) through forests dominated by conifers. These forests are most often characterized by a dense shrubby understory and the presence of thickets. It also inhabits overgrowing clearcuts, shrubberies, and fruit plantations (Jurczyszyn & Wołk 1998; Juškaitis 2003b; Bright et al. 2006; Czapracka et al. 2010). It also occasionally inhabits moist forests, such as alder swamps. Berthold and Querner (1986) found hazel dormouses in reedbeds of Lake Constance – 25 m from the shore and in water over 50 cm deep. Garncarz (2025) also obtained clear evidence of successful settlement and breeding of this rodent in tit nesting boxes located in the reedbed of the mid-forest pond „Loski" in the Strzelce Opolskie Forest District. Another individual was found in the reedbeds at the edge of a small pond, the shore of which was covered by a wet alder-birch forest with a rich undergrowth (Ekiert 2006).

Adult dormice are territorial during the breeding season, and their individual home ranges form the basis of the population's social organization. More mobile males occupy larger home ranges (0.32–0.73 ha) than more stationary females (0.14–0.25 ha). The home ranges of adjacent individuals may partially overlap (Bright & Morris 1992; Juškaitis 2008). In three areas in Promno Landscape Park, the hazel dormice population density was 0.34, 0.43, and 3.34 individuals/ha, and was many times lower than that of other common forest rodents (Czapracka et al. 2010). Similar densities in spring (0.5–1.4 individuals/ha) and autumn (2.3–4.3 individuals/ha) were recorded in Lithuania. Higher dormouse densities were found in optimal habitats in England (up to 8–10 indiv./ha), Sweden (3.0–6.7 indiv./ha), and Italy (6.76–8.48 indiv./ha). Occasionally, as many as 15 animals per hectare were recorded (reviewed in Juškaitis 2008), but the high and very high dormouse densities reported by some authors may be related to studies conducted on too small areas, leading to inflated results. Almost all studies on dormouse concern populations inhabiting nest boxes.

In summer, dormouse build spherical 'summer' nests with a side entrance, typically 6–12 cm in diameter. Nests built by pregnant females are larger (10–15 cm in diameter) than those built by males, sexually immature individuals, or non-breeding females. Summer nests are constructed from dry or fresh leaves and grasses. Nests containing young are lined with fine plant material. The dormouse can have from 3 to 12 nests within the territory, which may be used by different individuals, as demonstrated by telemetry studies.

Telemetry studies also showed that in the high-stem forests of the Bavarian Forest, as many as 40% of nests were located in the treetops – up to 33 m above ground level (Müller-Stiess 1996). In English forests, 45% of nests were built at heights of 8 to 15 meters, 26% in the undergrowth layer at 2–7 meters, and 29% in blackberry bushes (Bright & Morris 1992). In the Promno Forest, the highest of the 12 nests found was up to 1.5 m above ground level. None of the nests were located directly on the ground (Czapracka et al. 2010).

Dormouse also utilizes the nests of various shrub-nesting bird species. They use them as a base for their nests or rebuild them. They were most frequently found in the nests of great reed warblers, sedge warblers, and various warblers. Dormouse also built nests in old magpie and wren nests, and in the base of rook nests (reviewed in: Juškaitis & Büchner 2010). In Podlasie, A. Zbyryt (unpublished information) noted

the presence of this rodent in the outer edge of white stork nests. It is estimated that the minimum area for a viable dormouse population is 20 hectares (Bright et al. 1994).

The highest altitude locations of the dormouse in Europe were found in Macedonia (1980 m a.s.l.; Kryštufek & Petkowski 1990), in the Austrian Alps (1920 m a.s.l.; Spitzenberger & Bauer 2001), and in the Slovak Tatra Mountains (up to 1900 m a.s.l.; Anděra 1987). In Poland, the highest altitude of the dormouse was recorded in the Tatra Mountains – on Uhrocie Kasprowe at 1750 m a.s.l. (Ważna et al. 2012).

Before 1980, the dormouse seems to have been known mainly in southern and eastern Poland and in isolated localities on the coast and along the border with the Kaliningrad Oblast (Russia), and was absent from western and central Poland, Pomerania, and Masuria (Pucek 1983, fig. 4A). Currently, the dormouse occurs in a continuous range from the Sudetes and the Sudeten Foreland through the Carpathians and the Carpathian Foothills to the Lublin Upland (fig. 4B). More scattered localities come from the Małopolska (Little Poland Upland), the Masovian Lowland, and Podlasie, as well as from the northern and eastern parts of the Masurian Lake District (Jurczyszyn & Wołk 1998). A new locality was also recorded in the Elbląg Upland and in the vicinity of Ełk and Olecko (Zagrodzki 2023; Bujnowski 2024). In central and northwestern Poland, only single localities of this rodent have been recorded. In Greater Poland, it is known from the Promno Landscape Park (Kałuża 1987; Czapracka et al. 2010) and in Ostrów County in the Greater Poland part of the Barycz Valley Landscape Park (Ekiert 2006). There are no records from the Baltic Coast in the last 20 years.

In the first quarter of the 21st century, the dormouse occurs in a continuous range from the Sudetes and the Sudeten Foreland through the Carpathians and the Carpathian Foothills to the Lublin Upland (fig. 2B). More scattered localities come from the Wyżyna Małopolska (Lesser Poland Upland), the Masovian Lowland, and Podlasie, as well as from the northern and eastern parts of the Masurian Lake District. Recently, more records have come from the Sudetes, and a relatively large number of new sites have been discovered in the Lubliniec Forests and the Stobrawski Landscape Park in Upper Silesia (Hebda et al. 2024, K. Belik – unpublished data). Jurczyszyn and Wołek (1998) attribute the lack of dormouse trees in the central and locally northwestern part of Poland to the intensive deforestation carried out in these areas in the past

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