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## REINTRODUCTION AND ACTIVE PROTECTION OF THE FAT DORMOUSE (*GLIS GLIS* L.) IN POLAND

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### ABSTRACT

In Poland, active protection of the fat dormouse started relatively late. The pilot reintroduction programme was initially undertaken in the Sieraków Landscape Park in 1997 and was successful. The population has adapted to the settled area and is now stable. In 2003, the next stage of fat dormouse reintroduction in Poland began. The Szczecin National Park was chosen for this purpose. Fat dormice settled in the Puszcza Bukowa Wilderness in the Trawiasta Buczyna reserve, and then in 2004 in the Kolowskie Parowy reserve. In 2005, no reproduction was observed as it was not a beech mast seeding year, but in 2006 a juvenile individual was spotted. In 2011, the next stage of reintroduction began, this time in western Poland. Ultimately, the Barlinek-Gorzów Landscape Park was chosen. The process of active protection of the fat dormouse is supported by educating the local community, enriching the nutritional offer, and increasing the number of nesting boxes for the rodent.

### KEYWORDS

active protection • reintroduction • fat dormouse • *Glis glis*

## 1. Introduction

One of the most important elements of active animal protection is reintroduction. It is effective when two conditions are met: knowledge of the causes of extinction of a species

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in a given area, and thus the possibility to eliminate the causes, and the lack of need to significantly change the environment in the area of primary occurrence. The purpose of reintroduction according to Pullin (2007) is: to increase the chance of survival of a species, to restore it in a given ecosystem, and to restore and preserve the ecosystem's biodiversity. However, all activities and tasks are ineffective if they are not synchronised at one time and place (Perzanowski 1992). An element of reintroduction in the case of low-number populations is conducting closed breeding in zoos or in special farms. It is a genetic reservoir of individuals released into target habitats (Żurowski 1992). Reintroduction is a long-term process and does not always bring the expected result. The case of dormouse proves that only a thorough understanding of the causes of the destruction of the population, eliminating them and, with supportive measures (creating living places and adequate public education), reintroduction can be a complete success.

## 2. Morphological features

The fat dormouse (*Glis glis* L.) is the largest of the four species from the *Gliridae* family found in Poland. The same family includes the forest dormouse (*Dryomys nitedula*), the hazel dormouse (*Muscardinus avellanarius*) and the garden dormouse (*Eliomys quercinus*). Depending on age, body length can range from 107 to 186 mm, and body mass is 150 g on average. A fluffy tail, which is covered with hair over its entire length, can range from 92 to 135 mm and is helpful when jumping from branch to branch (Terlecka 2013). The fat dormouse has a soft, dense and fluffy fur, which is gray on the back (Bilińscy 2008), with a yellowish tone in the summer, and snow-white to light gray on the belly (Jurczyszyn 1994). The tail and the belly coat colour are the features that distinguish the fat dormouse from other representatives of the *Gliridae* family. Characteristic features of fat dormice are also large, dark eyes with a black fur rim and large, round and very mobile ears (Terlecka 2013). These features are associated with its nighttime activity. On the forearms and the head there are numerous sensory hairs that help in orientation as well as skillful climbing and running around trees. Feet equipped with claws and paw pads are adapted for fast movement on tree trunks and for jumping. The hind legs have 4 fingers, and the front have 5. Determining sex of the dormouse is difficult as sexual dimorphism is virtually absent. Females are only slightly smaller than males (Terlecka 2013).

## 3. Biology of the species

### 3.1. Social organisation

It was not found that fat dormice establish a social hierarchy in the natural environment. Usually, each individual has their own resting place which they do not share with other dormice. The exception are young with their mothers who stay close to the female until they reach full maturity, and sometimes they hibernate together (Santini

1978). They never cooperate in the search for food, they even disturb one another by taking and stealing food from each other (Wąsik 2005).

Based on research performed at the Faculty of Biology of the Adam Mickiewicz University in Poznań in 1994 (Białecka-Jagodzińska 1997) on a group of five fat dormice, it was found that the animals staying together in a closed room establish a social hierarchy among themselves, although the criterion of choosing the dominant is not clear. In these studies, the dominant animal had the shortest tail. Domination was revealed only at the time of feeding when the dominant individual was the first at the food bowl from which he deterred the other individuals. It clacked characteristically, jumped and even bit. It was possessive to such an extent that other fat dormice had to look for food on the ground or among leaves in a cage (Białecka-Jagodzińska 1997).

### 3.2. Food preferences

The basic food for dormice is plant and tree seeds and fruit. In late autumn and early summer, the dormice feed mainly on soft fruit – cherries or apples, later on fruit of beech, oak, hornbeam, and also hazelnuts and other nuts (Terlecka 2010). Leaves and fresh tree buds are also part of their diet (Jurczyszyn and Zgrabczyńska 2002). They also do like small insects, snails or eggs and chicks (Winecki et al. 1998). Food diversity is mainly determined by its current availability. An important factor influencing the development and reproduction of rodents are mast seeding years of individual deciduous species, especially the beech.

### 3.3. Reproduction

The fat dormouse wakes up from hibernation at the end of May or at the beginning of June. In July, after a long feeding period, there is the mating season, and then after a 30-day pregnancy, in a nest or hollow, averagely 5 (3–11) young weighing 1–2 grams are born. A female raises them alone, without the help of a male. Fat dormice are very caring mothers – they feed young until the 40th day of life (Terlecka 2013). On the 22nd day, young open their eyes, and as they are one-month-old they can already be found on branches near the nest. They reach full sexual maturity only at the age of 2 (Jurczyszyn and Zgrabczyńska 2002, Terlecka 2013).

Dormouse reproduction is closely related to food availability. If the dominant tree species does not fruit, animals generally do not breed. This also happens during rainy springs. Then they wake up from hibernation even later, i.e. around June, and fall asleep 3 months later, i.e. in September. It has not yet been studied how the fat dormouse “senses” that the trees are not fruiting (Kowalski).

### 3.4. Habitat conditions

The fat dormouse prefers extensive, old deciduous forests, especially beech and oak-hornbeam stands as well as large parks and orchards, sometimes it inhabits attics of

houses located near the forest (Bilińscy 2008). Although single-storey stands are sufficient, a very important forest feature for the fat dormouse is the full tree crown cover which allows them to move and to mate between unrelated individuals (Terlecka 2010). 68.5% of the Polish forest area is coniferous, of which 58.2% is pine. Such conditions are inadequate for this mammal (Milewski 2017).

The fat dormouse is considered a habitat stenobiont, living in deciduous forests mixed with dense undergrowth. It was most often observed in acidic beech forests (Terlecka 2010), the *Luzulo-Fagenion* syntaxonomy, where the dominant species is the beech, and a maple, hornbeam, oak, fir or spruce admixture may be present.

The fat dormouse nests in abandoned nesting boxes, bird nests and hollows, as well as in attics of houses, in barns, woodsheds and on the hunting stands (Terlecka 2010).

They move almost exclusively in treetops, nimbly jumping from branch to branch, as the thickness of the branches does not matter. They lead a night life, sleeping through days in their hideouts. At night, in treetops, one can hear sounds that cannot be confused with any other. The peak of voice activity falls in the second half of August but in the absence of food resources it drops to almost zero or does not occur at all (Kowalski, www).

The dormice descend to the ground usually only to look for hibernation burrows that they take over from other rodents. They modify their winter shelters by adding an oval chamber at the end of the burrow. Individuals usually live in dens on their own – sometimes a mother with young. During hibernation, the animal sleeps curled up, covered with its little tail. Heartbeat rate decreases to a few beats per minute, and the body temperature is several degrees above zero. They sleep through the entire hibernation period without waking up, using only their own fat resources accumulated during the period of activity (Kowalski, www).

The fat dormice are active from the turn of May and June to November, or September if food is scarce, and they do not reproduce.

## 4. History of and reasons for the decrease of the species population in Poland

### 4.1. Range of occurrence

Currently, the range of occurrence of the species covers southern and eastern Europe as well as southwestern Asia. In Europe, the dormice cover areas from France and northern Spain to the Volga River, in the Caucasus. In addition, they can be found in northern Asia Minor, Iran and Turkestan (Terlecka 2010).

W Polsce bytują praktycznie niemal w każdym miejscu, gdzie istnieją dla nich odpowiednie warunki. They are present in large numbers in mountains and foothills, and to some extent in lowlands, in the center and north of the country. The fat dormice are also found in the southern Lublin region and in the Holy Cross region (Kowalski, www) and in central Poland – in the Koziencice Wilderness.

## 4.2. Changes in the number of the fat dormice over the years

Information on previous changes in the number of dormice is scarce, due to the fact that scientists became interested in this species only in the 1990s. In addition, the time and place of their activity make them hard to notice. It is very difficult to inventory them and in most cases it is impossible to provide a specific number of individuals in a given area. The information that was the basis for the protection of the fat dormouse concerned the number of the observed sites which at a certain point began to decrease drastically. Posts registered before 1950 in the north-western Poland were no longer recorded in the 1990s (Jurczyszyn and Zgrabczyńska 2002). In recent years, however, the existence of several dozen sites was reported and most likely these are not new but ones that have not been detected in previous studies. Also, few fat dormice sites in the “Buki nad Jeziorem Lutomskim” reserve in the Sieraków Landscape Park in Greater Poland were confirmed, as well as two sites in Pomerania – in Dąb and Kocierz (the Resko Forest Division) (Kepel 1994). Unfortunately, these populations cannot spread to the surrounding forests because they are isolated by meadows, fields and thin coniferous forests, which are barriers that are difficult to overcome for the fat dormice (Stankiewicz 2005). A big surprise for scientists inventorising the sites in the north-west was the lack of the fat dormouse in the area of the Puszcza Bukowa Wilderness near Szczecin – over 9 ha of a compact forest stand, mainly old trees. It was even stranger as the fat dormouse was found around this complex in forests several dozen kilometers away, e.g. in Dobra, Międzyzdroje and Zalesie. In order to solve the puzzle, the history of the Puszcza Bukowa Wilderness was traced back. Map data from approx. the 17th century – the map by Lubinus – indicate that these forests were completely cut down because they are not marked on this map. In this way, the fat dormouse was deprived of space and living conditions. It was not possible to resettle this area due to the lack of connection between this forest complex and neighbouring forests (Jurczyszyn and Zgrabczyńska 2002).

## 5. Actions to improve the population of the species

### 5.1. Legal protection

The fat dormouse is legally protected in Poland. This is conditioned by the following legal acts:

- Regulation of the Minister of the Environment of September 28, 2004 on protected species of wild animals, Journal Of Laws No. 220, item 2237 – strict protection status, the species requires active protection.
- Berne Convention – Annex III (species of wild animals whose exploitation should be regulated so that the populations of these species are not endangered).
- IUCN Red List – the category of species of least concern (LC).

## 5.2. Fat dormouse reintroduction

Interest in the number of the fat dormice only increased at the beginning of the 1990s, and so relatively late. Previously, only individual sites were registered, and became forgotten due to lack of interest. An example could be a site in the “Buczyna Szprotawska” reserve, discovered in the 1950s, which was forgotten until 1994 when Mirosław Jurczyszyn – a member of the Polish Society for Nature Conservation “Salamandra” and an employee of the Adam Mickiewicz University rediscovered it. He found that as of today, it is one of the largest clusters of fat dormice in western Poland. This discovery gave rise to a new chapter in the history of the fat dormouse. “Buczyna Szprotawska” is a partial reserve, in which care cuts, removal of dead trees and limited economic activity are allowed. According to an action plan from the mid-90s, rejuvenation of the forest stand was planned, which meant cutting down old trees in large areas of the forest in various places and replacing them with young trees that needed 30–40 years for fructification period to begin. The plan was to be implemented up until the old trees were completely replaced with young trees. It was a major threat to the population of the fat dormouse, which would be deprived of shelter and food (Kepel 1994). To draw attention to these threats and to find a solution, on February 15, 1995, the Voivodship Nature Conservator in Zielona Góra convened a conference in Szprotawa which was attended by representatives of the Regional Directorate of State Forests in Zielona Góra, representatives of the Szprotawa Forest Division, and members of the Polish Society for Nature Conservation “Salamandra”. During the deliberations, each party presented its own point of view and a common policy which satisfied both the foresters and the fat dormouse supporters was determined. The action plan was changed to a more favourable one, assuming tree felling on smaller areas, distant from each other, which enabled the preservation of the crown cover, and in turn allowed preserving the fat dormouse population (Janyszek 1995). This population has been functioning to this day.

In 1997, the first phase of the fat dormouse reintroduction in Poland began. It was a pilot programme. A single fat dormouse site was discovered in the Sieraków Landscape Park and it was decided that the species would be introduced to other places of this park, ones that are rich in old beeches, other trees, and shrubs such as the raspberry, blackberry, hornbeam, oak, hazel, black lilac. Individuals that were to settle the area came from the “Buki nad Jeziorem Lutomskim” reserve. They were introduced in two stages: the first group of 25 individuals in 1998, and the second group of 18 individuals in 1999. The management of trapped dormice differed: some of them were released after a week of acclimatisation in the target area, others were kept after capture in cages in the reserve for a year together with young born in captivity. All individuals began acclimatization in the Sierakowski Landscape Park at the same time. The animals were placed in adaptation cages for a week where they were receiving water and food. There were no more than 4 individuals in a cage. After a week they were released. The second round of fat dormice released in 1999 was equipped with telemetry transmitters so that their lifestyle, activity and moving paths could be studied. Most transmitters were damaged or lost within a few

days. From those that have not been lost, it was read that the dormice kept in the acclimatisation cages for a long time migrate to shorter distances than the ones caught and released immediately. Their nighttime paths were also discovered, and many observations gave rise to further studies, e.g. on behavior. In the years 2000–2002 more individuals were introduced to the existing, strong population. These animals acclimatised perfectly in the park, creating a stable population whose individuals could be used to settle in other areas (Jurczyszyn 2001).

In 2003, another reintroduction of the fat dormouse began in the area of the Szczecin National Park, in the Puszcza Bukowa Wilderness, to the “Trawiasta Buczyzna” reserve. The program was financed by the EkoFundusz Foundation and from the funds of the Small Subsidies Programme of the Global Environment Fund. It turned out that reintroductions of the fat dormice took place there twice before – for the first time before World War I, the second in the early 1960s (Terlecka 2010). They did not turn out to be effective because no substantive plan was developed at that time. Reintroduction consisted in the fact that several dormice, caught from other areas, were released in the surrounding forests. Improperly acclimatised animals most likely dispersed across a large area and died before breeding.

Another reintroduction has started in 2003 and was preceded by numerous studies and a pilot programme, and had been developed in detail (Jurczyszyn and Zgrabczyńska 2004). The released animals came from a special breeding facility at the Poznań zoo and the AMU Ecological Station in Jeziorki near Poznań. Some individuals were caught in the natural environment, also from the population in the Sieraków Landscape Park. In the first year, 25 fat dormice were introduced into the Puszcza Bukowa Wilderness. Each of them was equipped with a telemetry transmitter. For the monitoring purposes, aerial photographs and so-called live traps that allow checking a lot of dormice in the wild without harming them. The acclimatisation period was about a week long. The animals were kept in special wire cages hung on trees. Inside the cage there were leafy beech shoots and wooden booths in which animals could take shelter during the day. After releasing the dormice, it was observed that several of them dug small holes in the ground and immediately fell into a winter sleep, which was a surprise to scientists, as the dormice were released in September. The reason was probably a large supply of fat, which the animals accumulated under human care. The rest of dormice foraged for food for several weeks, settled in the area, divided it into individual territories, and then also fell into winter sleep (Stankiewicz 2005). It was important that the rodents did not disperse and fall asleep in close proximity to each other. According to the people who tracked the location of the fat dormice using telemetry, all of them survived until winter and dug holes near the place of release (Bogdanowska 2003). In the summer of 2004, 8 individuals from the first reintroduction group were found. However, it should be taken into account that observing dormice is very difficult and possible not all individuals have been recorded. There were also no young then, so it can be concluded that the dormice did not breed. It should be remembered, however, that the specific feature of fat dormice is that they reproduce only in the fructification season of beeches or other species that provide them with a food base, i.e. every 2–3 years.

In July and August 2004 another group of fat dormice (32 individuals) was introduced to the “Trawiasta Buczyzna” reserve and to a new reserve in the same forest, i.e. to “Kołowskie Parowy” – 24 individuals. The entire preparatory scheme was the same as the year before. After releasing the animals, the observations were made very carefully. They showed that the dormice perfectly acclimatised in the new conditions, finding their own hollows and places of shelter, and became independent in search of food. Only sporadically they returned to their cages to get the given food. In October, the animals began to dig burrows and fell into a winter sleep (Jurczyszyn and Zgrabczyńska 2004).

In 2005 another group of dormice was settled – about 60 individuals, but as before, no offspring was observed, as it was a year scarce in fruits of beech and other large-seeded trees (Dzięciołowski and Jurczyszyn 2005).

At the turn of 2005 and 2006 the “Salamandra” Society carried out an action to enrich the food base for fat dormice by planting trees and shrubs in the Puszcza Bukowa Wilderness. In addition, this created migration routes, thanks to which rodents could freely colonise nearby areas by moving between the treetops connecting the neighbouring areas. In total, about 2,000 tree seedlings (cherry, apple, plum and pear trees), as well as shrubs that provide nutritious fruit and shelter (the hazel, dog rose, black elder and blackthorn) were planted. In 2006, the last group of 60 dormice was settled in. In September of the same year, the first young fat dormouse was found in the “Kołowskie Parowy” reserve. It was irrefutable evidence that the animals from previous reintroductions acclimatised to the environmental and food conditions that allowed reproduction (Dzięciołowski and Jurczyszyn 2005).

Currently, the population of fat dormice in the Puszcza Bukowa Wilderness is so stable that it can easily be used as material for subsequent reintroductions, not only in western and north-western Poland.

In 2011, the next stage of the fat dormouse reintroduction started under the “Fat dormouse reintroduction programme for north-western Poland”, implemented by the “Salamandra” Society. For this purpose, the Barlinek-Gorzów Landscape Park was selected. It is an area rich in old beech stands, mixed forests with beech and oak, hornbeam, hazel and larch trees. Despite the favourable habitat, fat dormice were not found in this area during the inventories in 2008 and 2009. At first, approximately 40 animals were released in the communes of Barlinek, Kłodawa and Strzelce Krajeńskie. The rodents came from a special breeding facility at the Poznań zoo and the AMU Ecological Station in Jeziorki near Poznań. The method tested in previous years was used. Animals were acclimatising for a week in special wire booths and were fed. Then the cages were opened but a constant access to food was maintained due to fears that the dormice would spread around the area in search for food and would not be able to meet and breed. The dormice have been marked with tattoos and radio transmitters. Populations were also monitored with a radio watch – the dormice were provoked to make sounds by being played native sounds, and then counted. (abc / Środowisko 2011). By 2015, about 150 individuals were introduced in a similar way. The population is constantly monitored by



the “Salamandra” Society. In 2013, the food base was enriched with 1000 fruit trees (Jurczyszyn and Dzięciołowski 2013), while in 2017 additional nesting boxes were hung (Anonim 2017).

## 6. Active protection of the fat dormouse

### 6.1. Active protection

The activities included in the active protection of the fat dormouse include, among others, hanging additional nesting boxes, enriching the food base by planting fruit trees and shrubs, creating educational paths and organising workshops that raise public awareness of the habits and conservation of the species, and inventory of already inhabited breeding sites.

The Nature Society “Bocian”, which developed the 3-stage Fat Dormouse and Forest Dormouse Protection Project in 2000, actively participates in the protection of fat dormice.

The first stage involved inventoring nesting boxes for birds at the turn of September and October in the forest divisions included in the programme. Following forest districts are included: Sokołów, Mińsk Mazowiecki, Garwolin, Ostrów Mazowiecki, Radom, Kozienice, Zwoleń, Stąporków, Przysucha, Barycz, and Skarżysko.

The second stage involved purchasing and hanging of special boxes for fat dormice and birds. Each type of box has been specifically constructed so that species do not interfere with each other. In 2003, during an inspection in the Kozienice Wilderness carried out a few days after hanging boxes for fat dormice, it turned out that 70% of them were occupied by representatives of this species. At this stage, the food base has been enriched by planting fruit trees, as well as by constructing and hanging special feeders for the rodents near the forester’s lodges, which can also be used for educational purposes.

The third and final stage involved annual controls of the boxes, evaluation of the project’s effectiveness, and broad education in form of lectures and talks for children, youth and local population, and workshops and training for foresters.

In 2005, 685 nesting boxes were hung. In 19 of them, rodents or their droppings were found in the forest divisions of Przysucha, Radom, Zwoleń, Kozienice (Terlecka).

An important element is also supporting places where the fat dormouse is present but the conditions are no longer suitable for it. Old beech forest stands often have to be reduced due to planned cuts or safety reasons. Then, nesting sites for fat dormice can be provided. In the Cisów-Orłowiny Landscape Park (in the Daleszyce Forest Division, in the Sieraków Forest District), where there was a small population of fat dormice, it was decided to help the animals to breed. In 2015, the project “Conservation of the Gliridae rodent family in the Cisów-Orłowiny Landscape Park” was initiated, whose goal was to provide the fat dormouse with optimal conditions for development and reproduction – 200 nesting boxes in various areas of the park were hung. Monitoring after a breed-

ing season and a rearing period showed promising data. Over 1/3 of the boxes was inhabited, and more than half were penetrated by the rodents. In addition, no other Gliridae rodents than the fat dormice were found. It can be suggested that one of the factors limiting the population is also the lack of optimal breeding sites (Kosin 2015).

As a result of monitoring carried out by the “Salamandra” Society in 2013–2015, locations of fat dormice in the Ustka Forest Division were observed, and then precisely determined. The isolation of deciduous and mixed forests in the stand turned out to be a significant problem, which prevented fat dormice from spreading to the surrounding forests. Nesting boxes hung in 2015 and 2017 proved to be helpful, as they form a specific network of routes that facilitate the migration of dormice through habitats that are unfavourable to them. In 2017, evidence of colonisation of the booths hung in 2015 was found. This gives hope for successful colonisation of nearby areas. Intensive work led by the “Salamandra” Society is underway to determine the number and distribution of fat dormice in the forests of the Slovincian Coast and the Słupsk Plain. The search also included the nearby Damnica Forest Division, where the presence of the mammal was noted. The number and distribution could not be determined as it was not a mast seeding year of beech, which hinders or even prevents the monitoring of fat dormice. The research will probably be continued during the fructification period of the main seed species of the forests (Anonim 2018, Anonim S. 2017).

## 6.2. Actions to support the protection of the fat dormouse

Nature Societies organise seminars, lectures, broadcasts and talks about the Gliridae rodent family for both schoolchildren and students of life science universities. In 2005, the Nature Society “Bocian” organised workshops on the Gliridae rodent family to which representatives of several nature organisations, employees of the Ministry of the Environment and foundations dealing with nature conservation in Poland were invited. They have jointly developed an outline strategy for conservation of the Gliridae rodent family in Poland. In all 11 forest divisions covered by the conservation programme, they also conducted trainings on these mammals and their protection. An information website describing reintroduction and the fat dormouse itself was created, and a lot of posters and information folders were published (Anonim 2005).

A good example of supporting the awareness of tourists and the local population are actions taken in the area of the Buczyna Szprotawska reserve, where the ecological path “Popielica” (Polish for *fat dormouse*) consisting of 10 stops describing the habits and behavior of this rodent was created. Also, two walking paths – yellow and red were created there, which make it possible to get to know the habitat, the area and its characteristic features. The work done by the employees of the Cisów-Orłówny Landscape Park should also be emphasised, as they organised extensive education, hung additional boxes for the rodents, and conducted workshops consisting of theoretical and practical activities (Ptak 2015, 2017).

## 7. Threats to the species

### 7.1. Threats not stemming from human activities

There are relatively few predators that can realistically threaten fat dormice in the wild. In Poland, it is known that they are a part of the tawny owl diet (*Strix aluco*) (Biliński 2008). With high densities of fat dormouse population, their share among the victims may be even several percent. Other predators include: the ural owl (*Strix uralensis*), Eurasian eagle owl (*Bubo bubo*) and marten (*Martes* sp.). During the descent from trees they may also fall prey to ground predatory species, including cats (*Felis catus*) and domestic dogs (*Canis lupus familiaris*), foxes (*Vulpes vulpes*) and raccoon dogs (*Nyctereutes procyonoides*).

### 7.2. Anthropogenic threats

The main cause of almost complete extinction of the fat dormouse was and is man. Cutting down deciduous and mixed forests on large areas in a very short time, without leaving areas of old trees in close proximity to each other, was the cause of vanishing of the species. Forest management from a few years ago led to the division of large forest complexes into smaller fragments separated by wide open spaces, thereby fragmenting habitats, which limits long-distance migration of animals, including fat dormice (Kowalski, www). Often, thinning of forest complexes is also carried out at fat dormouse occurrence sites. Unconscious action of this type additionally accelerates the extinction process of this species.

## 8. Conclusions

1. Reintroduction is one of the most important and effective methods to restore the species to the ecosystem in which it ceased to occur. The case of the fat dormouse proves that this process can conclude as a complete success if specific conditions are met.
2. Migration routes between forest complexes are an important element for the development of the population of fat dormice in areas of occurrence. If they are naturally interrupted, they should be rebuilt by planting trees and shrubs that will connect the migration routes and enrich the food base.
3. The increase in the number of fat dormice in areas where they have been reintroduced suggests that this species is characterised by high adaptability and each reintroduction that is in accordance with the already adopted programme may be fully successful.
4. Local education of the society proved to be an important element supporting the reintroduction of fat dormice. As a result, the local population began to pay more attention to the need to protect the fat dormouse.

5. The example of the solved problem related to the fat dormouse in Buczyna Szprotawska shows the importance of dialogue between organisations responsible for nature protection, foresters and local self-governments. Thanks to constructive conversation and mutual understanding, a common plan was developed, which is a compromise for each party.

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## REINTRODUKCJA I OCHRONA CZYNNA POPIELICY SZAREJ (*GLIS GLIS* L.) W POLSCE

### STRESZCZENIE

Czynna ochrona popielicy szarej rozpoczęła się w Polsce stosunkowo późno. Pilotowy program reintrodukcji został pierwotnie podjęty w 1997 roku w Sierakowskim Parku Krajobrazowym i zakończył się sukcesem. Populacja dostosowała się do zasiedlonego obszaru i jest teraz stabilna. W 2003 roku rozpoczął się kolejny etap reintrodukcji popielicy w Polsce. Do tego celu wybrano Szczeciński Park Narodowy. Popielice zamieszkały w Puszczy Bukowej w rezerwacie „Trawiasta Buczyzna”, a następnie w 2004 roku w rezerwacie „Kolowskie Parowy”. W 2005 roku nie zaobserwowano rozmnażania z powodu braku roku nasiennego buka, ale w 2006 roku zauważono już młodego osobnika. W 2011 roku rozpoczął się kolejny etap reintrodukcji, tym razem w zachodniej Polsce. Ostatecznie do tego celu wybrano Barlinecko-Gorzowski Park Krajobrazowy. Proces czynnej ochrony popielicy szarej wspierany jest przez edukację lokalnej społeczności, wzbogacenie oferty żywieniowej i zwiększenie budek lęgowych.

### SŁOWA KLUCZOWE

czynna ochrona • reintrodukcja • popielica • *Glis glis*