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A record of a melanistic forest dormouse *Dryomys nitedula* in Lithuania, with a review of colour anomalies in dormice (Gliridae)

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Abstract. A melanistic forest dormouse *Dryomys nitedula* was recorded among 125 individuals marked in a small isolated local population in central Lithuania. Until now, a totally black individual of *D. nitedula* was captured only in western Ukraine. A review of the literature on colour anomalies in European dormouse species has shown that this phenomenon is rare in dormice. Several black hazel dormice *Muscardinus avellanarius* were recorded in the same locality in northern Germany in 1972 and 2015, and one such dormouse was captured in the UK. Partial albino *M. avellanarius* was recorded in Germany. Two melanistic garden dormice *Eliomys quercinus* were collected in the Czech Republic, an albino specimen in France and a flavistic specimen in Germany. In the edible dormouse *Glis glis*, melanistic, albino, isabelline and flavistic individuals were recorded, all from Slovenia and the Czech Republic. Among aberrant-coloured European dormice, melanistic individuals were documented most often. Tail-tip albinism is more frequent among *M. avellanarius*, and this trait was recorded in several countries.

Key words: aberrant coat colour, melanism, tail-tip albinism

Introduction

Mammals of atypical colour are seldom observed in the wild. Such recorded cases are usually published, and such specimens are preserved in museum collections. Atypical colouration depending on the level of melanin production deficiency or excess, is usually classified as complete albinism, partial albinism or piebaldism, leucism and melanism (e.g. Łopucki & Mróz 2010, Abreu et al. 2013, Čanády 2015). However, there is still some divergence between authors regarding the terminology of aberrant coat colour (e.g. Nedyalkov et al. 2014, Holcová-Gazárková et al. 2016, Cichocki et al. 2017, Lucati & López-Baucells 2017). Some authors distinguish flavism – yellow or red hair colouration associated with the production

of pheomelanin (Čanády 2016, Holcová-Gazárková et al. 2016, Cichocki et al. 2017) and isabellinism – a light grey colour variant (Holcová-Gazárková et al. 2016). Some other authors attribute the last two aberrant colourations to leucism (e.g. Łopucki & Mróz 2010, Nedyalkov et al. 2014). According to Lucati & López-Baucells (2017), flavism is attributed to hypomelanism.

Atypical colouration has been reported in many orders and species of mammals (e.g. Abreu et al. 2013, Cichocki et al. 2017, Romero et al. 2018). In small rodents and insectivores, complete albinism is rare, and leucism, flavism and melanism are the most common colour abnormalities (Łopucki & Mróz 2010, Nedyalkov et al. 2014, Čanády 2015, 2016, Brito & Valdivieso-Bermeo 2016). The relatively frequent



appearance of albino individuals in the European mole *Talpa europaea* populations results from low predator pressure due to their subterranean way of life (Łopucki & Mróz 2010, Nedyalkov et al. 2014). Aberrant-coloured specimens may be frequent in some populations. For example, 16 melanistic bank voles *Myodes glareolus* were captured in the same forest in Poland (Łopucki & Mróz 2010).

Indormice (Gliridae), anomalous coat colours covering the whole body are rarely recorded. Information on aberrant coat colour in the edible dormouse *Glis glis* was reviewed by Holcová-Gazárková et al. (2016). Some records of other European dormouse species with anomalous colour are scattered in several local publications. The present communication aims to present a record of a melanistic forest dormouse *Dryomys nitedula* in Lithuania and summarize available data on atypical colourations recorded in European dormouse species.

Material and Methods

During 1999-2020, a long-term study of the local population of *D. nitedula* was carried out in central Lithuania (54°58' N, 23°30' E) at a study site with 70 nestboxes spaced in a 50 m grid system in an area of 13.5 ha. The study area was overgrown with a mixed forest stand containing Scots pine *Pinus silvestris*, Norway spruce *Picea abies* and birch (*Betula pendula* and *B. pubescens*). The study site was surrounded by forest stands unfavourable for *D. nitedula*. Nestboxes were inspected regularly during the entire dormouse activity season from late April until early September. Dormice captured in nestboxes were marked with aluminium rings (inner diameter 3.0 mm, height 3.0 mm). For a detailed description of the study site and study methods, see Juškaitis (2015).

Results and Discussion

During the entire study period, 125 individuals of *D. nitedula* were marked. All marked individuals except one had relatively light brown fur and grey tails (Fig. 1b). On 27 May 2020, an unusual-coloured male was found in an empty nestbox. His back, the top of the head, and the tail were much darker than in normal-coloured *D. nitedula* (Fig. 1a). The melanistic dormouse was photographed and weighed (body mass – 32 g), ringed and set free in the same nestbox. On 15 June 2020, the same dormouse was found in a neighbouring nestbox situated 50 m away, but it was not recorded later.

Most cases of atypical colouration among rodents recorded in Poland were from habitats with various degrees of isolation by suboptimal or unfavourable habitats (Łopucki & Mróz 2010). The same can be said about the melanistic *D. nitedula* recorded in Lithuania. Previous studies revealed that the population of *D. nitedula* in this forest tract can be considered a metapopulation, i.e. a system of local populations living in suitable habitat patches surrounded by pure Scots pine stands unsuitable for *D. nitedula* (Juškaitis 2015). The melanistic dormouse was captured in one of these local populations.

Until now, only one melanistic female *D. nitedula* has been captured in western Ukraine (Zakarpatska oblast) in 1979 (Pilyavskii & Abelentsev 1979). This individual was totally black, including a black belly. However, it needs to be clarified from this publication how many animals the authors tested in total. We know that no other publications on anomalous colour in *D. nitedula* exist. Rossolimo (1971) investigated individual and geographical variability of fur colour in 744 specimens of *D. nitedula* from different parts of its range in the former USSR but did not indicate any aberrant fur colour. She found noticeable geographic variation in coat colour based on which several subspecies were distinguished (Rossolimo 1971). For example, the fur of *D. nitedula angelus* in Mongolia is very pale (Stubbe et al. 2012).

Rossolimo (1971) also found geographic variability in the tail colours of *D. nitedula*. A tail with a whitish fringe and whitish terminal hair is typical for dormice living in the European part of the former USSR (see Fig. 1b), but a unicolour tail for dormice living in the Caucasus and Central Asia. *Dryomys nitedula* living in southern Italy (Calabria) show a distinctive white spot on the tip of the tail. Based on this and other fur peculiarities, it has been separated into a different subspecies *D. nitedula aspromontis* (Bisconti et al. 2018).

Among nearly 11,000 specimens of *G. glis* from throughout their range in Europe and Asia, only 38 aberrantly coloured specimens (0.5%) were identified. The authors recorded 20 melanistic, seven albino, four isabelline, four flavistic and five individuals with white tail stripes. All aberrant coloured *G. glis* came from Slovenia and the Czech Republic, and nearly all the cases of colour variants originate from the area of traditional dormouse hunting in south-central Slovenia (Kryštufek & Flajšman 2007, Holcová-Gazárková et al. 2016).

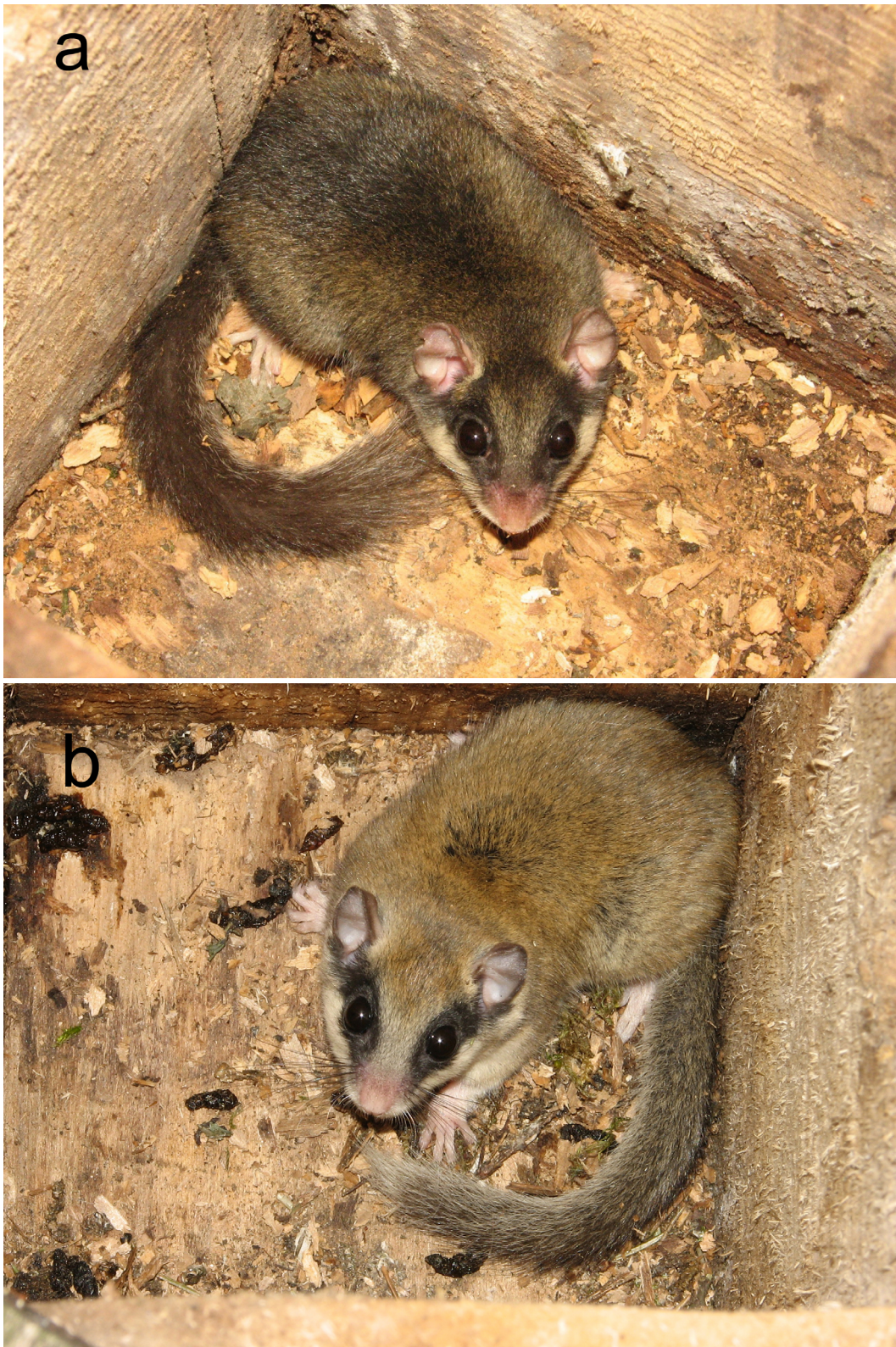


Fig. 1. Melanistic (a) and normal coloured (b) forest dormice *Dryomys nitedula* found in nestboxes at a study site in central Lithuania.

Two melanistic garden dormice *Eliomys quercinus* collected in Central Bohemia in 1897 are stored in the National Museum in Prague (Heráň & Mazák 1976). An albino *E. quercinus* was recorded in northern France (Nord – Pas-de-Calais) in 2012 (Boulangier 2013), and a

leucistic specimen in Germany (Rhineland-Palatinate) (J. Pulch and S. Büchner, pers. comm.).

Few melanistic individuals were recorded in the hazel dormouse *Muscardinus avellanarius*. Four black

dormice were found in two nestboxes at one locality in northern Germany (Schleswig Holstein) in 1972. In September 2015, approximately 10 km from this site, a free-hanging dormouse nest was found, and inside the nest was a mother (golden-coloured) with four juveniles, two of them the normal colour of *M. avellanarius*, but the other two were black with a white throat (Augustin et al. 2015, Augustin 2016). In 2016, the first black *M. avellanarius* was found in the UK, on the Devon/Somerset border, while checking dormouse boxes (Barrowclough & Groom 2016). A partial albino *M. avellanarius* was recorded in Germany (Hesse) (Lang et al. 2016), and there are no records of albino *M. avellanarius* to date.

It should be noted that *M. avellanarius* with aberrant colours are very rare. The single melanistic *M. avellanarius* was recorded in the National Dormouse Monitoring Programme, which runs from 1988 until now and includes 838 sites across England and Wales, spanning the current range for *M. avellanarius* in the UK (Scopes et al. 2023). During long-term studies of two Lithuanian populations of *M. avellanarius*, 5,750 individuals were marked in 1981-2022 (R. Juškaitis, unpublished data), and no specimens with a pigmentation disorder covering the whole body were recorded.

Muscardinus avellanarius with white tail tips have been recorded in several parts of the range (Lithuania, the UK, the Czech Republic, Germany, Italy, Moldova, and Sweden). The frequency of this trait varies significantly between populations. In the two best-studied Lithuanian populations of *M. avellanarius*,

it was 0.6% (13 out of 2,296) and 19.0% (219 out of 1,154), respectively (Juškaitis 2001, Juškaitis & Büchner 2013). White skin is seen in the tail-tips of naked juveniles, later covered with white hair. As indicated by individual marking, such dormice retain the white tail tips for the rest of their lives.

Muscardinus avellanarius with white patches on their fur are occasionally found. The origin of these white patches varies: a) white patches may be genetically determined and seen in young dormice. Such dormice were found more frequently in the Lithuanian study site, where the frequency of tail-tip albinism was comparatively high; b) white hairs may appear in older dormice and are recorded in recaptured individually marked dormice. For example, white hairs, which look like spectacles, sometimes appear around the eyes of dormice that are several years old; c) white hairs may grow after injuries over healed wounds (Juškaitis & Büchner 2013).

In summary, among aberrant-coloured European dormice, melanistic individuals were recorded most often in all dormouse species, and tail-tip albinism is more frequent among *M. avellanarius*.

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