



Albinism in the common shrew *Sorex araneus*

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Abstract

Albinism is a hypopigmentation disorder which occurs as a consequence of mutations in genes involved in melanin biosynthesis. It is recorded in many mammalian species but is generally considered to be rare in natural populations. Here, we describe a fully albino individual of the common shrew *Sorex araneus* found in south-western Poland. We also present previous findings of albino specimens of this species in Europe. Since the 1960s, there have only been three confirmed records of wholly albino individuals of common shrews in mainland Europe; however, albinism has been recorded more frequently in this species from Britain. In other shrew species, wholly albino individuals are also recorded very rarely.

Keywords Albino · Pelage · Fur colouration · Soricidae · Shrews

Albinism is a genetically heterogeneous group of inherited hypopigmentation disorders, which have been extensively characterised, especially in humans (e.g. Thomas et al. 2023). A well-known form is oculocutaneous albinism, in which the impairment of melanin biosynthesis results in white colouration of fur and pink or red eyes, along with other less obvious manifestations (e.g. Thomas et al. 2023). Although uncommon in natural populations, oculocutaneous or other forms of albinism have been found in many shrew species (Pucek 1964a). However, it is not possible to determine the genetic basis, and therefore confirm the precise type, of any particular instance of albinism from the phenotype alone (Jogahara et al. 2008).

Here, we describe an albino shrew which was killed by a cat in the village of Pławna Górna (51° 02' 36" N 15° 33' 50" E), near Lwówek Śląski in south-western Poland in April 2023. The animal had almost entirely white fur (Fig. 1), and only some of the underhairs, mainly on the belly, were light grey. The visible skin on the snout, legs and tail was pink.

Microscopic images of white guard hairs, taken from the back of the shrew, demonstrated that they did not contain melanin pigment (Fig. 2A) in contrast to those of a normally coloured shrew (Fig. 2B). It therefore seems likely that the animal represents a case of oculocutaneous albinism.

Morphological identification, including external body measurements, showed it to be a common shrew *Sorex araneus*. It weighed 7.6 g, the head–body length was 67 mm and the tail was 35 mm long. These measurements fit well within the data ranges for this species in Poland (Pucek 1964b). There were five unicuspid teeth in each upper tooth row, and these were reddish brown tipped (see Pucek 1981). The preserved animal is deposited in the scientific collection of the Mammal Research Institute, Polish Academy of Sciences (PAS) in Białowieża, Poland (register number of the specimen: 172010).

As well as the first potential oculocutaneous albino common shrew reported from Poland, this is the only albino among around 18,000 representatives of the species in the PAS collection. Albino common shrews are in general rarely recorded, despite the species being the subject of extensive research (see: Wójcik and Wolsan 1998; Searle et al. 2019). Apart from the case described here, there are only two confirmed records of wholly albino specimens of common shrew from mainland Europe. The first case was described from Russia (Dołgov 1968) and the second one from the Netherlands (Denneman 1987).

It is therefore remarkable that there are so many examples of albino common shrews from the British Isles. Two

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Fig. 1 Lateral and anterior views of an albino common shrew *Sorex araneus* found in south-western Poland in 2023. Photo by Tomasz Kamiński

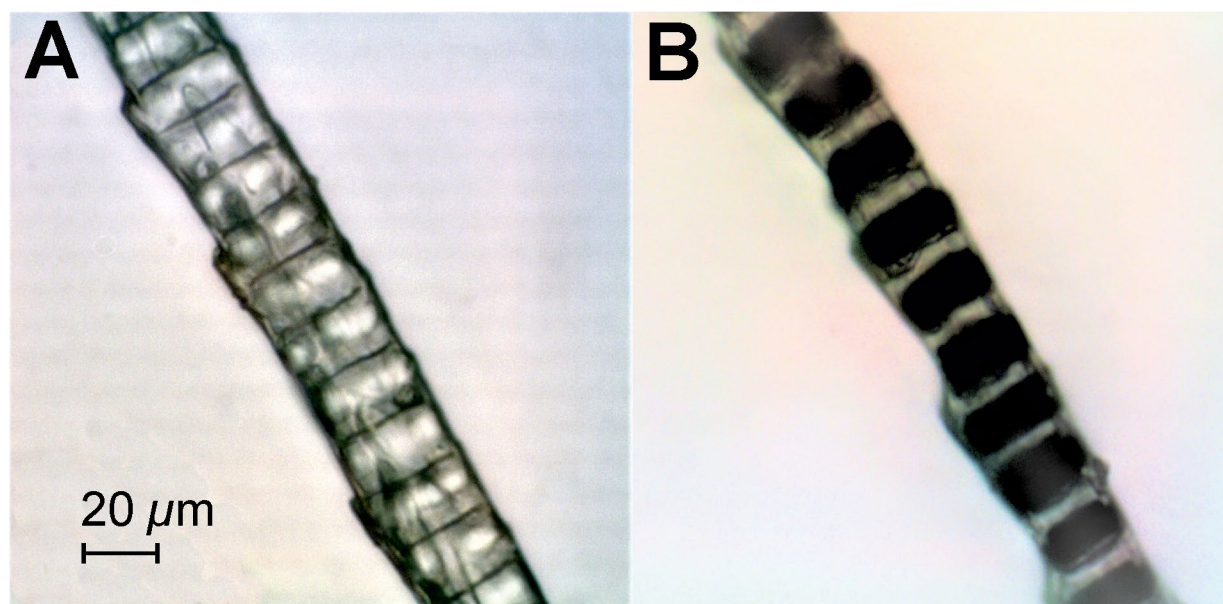


Fig. 2 Microscopic images of a guard hair from the back of the albino shrew (A) and a normally coloured shrew (B). Photo by Jan M. Wójcik

albino specimens were in the collection of the Natural History Museum, London (Gelling 2003; after D. Hills, pers. comm.). There are also two albino common shrew specimens in the National Museums of Scotland collection, one from the Isle of Skye in 1958 and the other from Edinburgh in 1977. At least four other albino common shrews have been described from Britain, one of them stated to have pink eyes and another to have eyes that were devoid of pigment (Bartlett 1843; Grabham 1895; Barrett-Hamilton 1910; Hollis 1910). In addition, there are reports of another four common shrews from Britain which were less clearly described as albino (Barrett-Hamilton 1910). There are also records of two cream-coloured or yellowish-white common shrews, from south-west Scotland (Service 1896, 1903) and from Pontypool in Wales (Bladon 1868). While it is uncertain

that all 14 of these shrews suffered from oculocutaneous albinism, rather than other manifestations of albinism, the number reported is high in comparison to the three that have now been reported from mainland Europe. However, rather than a higher prevalence of albino shrews in Britain, this may reflect the relative levels of interest in natural history among people in Britain and mainland Europe, together with the likelihood that they will take interest in unusually coloured animals.

Partial albinism seems to occur more frequently. A common shrew in the collection of the Mammal Research Institute, Polish Academy of Sciences, had a white spot, about 0.5 sq. cm in diameter, while three individuals had white ear tufts (Pucek 1964a; data updated). In addition, Chętnicki et al. (2007) described three specimens from Poland which

had white hair on the ear tufts. Once again, there is a high prevalence of partial albinism in common shrews from Britain, with white ear tufts present in about 20% of individuals (Crowcroft 1955). The frequency of their occurrence varies geographically, and they appear more common during dry years (Churchfield 1990).

Full albinism has also been recorded in single individuals of other shrew species, for example, house musk shrew *Suncus murinus* from Japan (Jogahara et al. 2008), short-tailed shrew *Blarina brevicauda* and least shrew *Cryptotis parva* from North America (Shapiro 1950; Sealander 1981), and Fraser's musk shrew *Crocidura poensis* (synonym: *C. schweitzeri*) from West Africa (Jones 1962). This again reflects the low frequency of albinism in this group of mammals.

Albino individuals are presumed to have lower fitness compared to those with wild-type phenotypes, as the condition is associated with a variety of anomalies (e.g. Creel et al. 1990). Abnormally coloured individuals may also experience higher detectability and predation risk as compared to wild-type individuals (e.g. Long and Gehring 1995). This might be expected to reduce the life expectancy and reproductive opportunity of albino individuals.

Declarations

Conflict of interest The authors declare no competing interests.

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References

- Barrett-Hamilton GEH (1910) A history of British mammals, vol 1. Gurney and Jackson, London, UK
- Bartlett LP (1843) Note on a white shrew mouse. *Zoologist* 1:287
- Bladon J (1868) Albino shrew (*Sorex araneus*). *Zoologist Ser* 2(3):1096
- Chętnicki W, Fedyk S, Bajkowska U (2007) Cases of coat colour anomalies in the common shrew, *Sorex araneus* L. *Folia Biol* 55:73–76
- Churchfield S (1990) The natural history of shrews. Christopher Helm, London, UK
- Creel DJ, Summers CG, King RA (1990) Visual anomalies associated with albinism. *Ophthalmic Paediatr Genet* 11:193–200. <https://doi.org/10.3109/13816819009020979>
- Crowcroft P (1955) Remarks on the pelage of the common shrew (*Sorex araneus* L.). *Proc Zool Soc London* 125:309–315
- Denneman WD (1987) Een albino *Sorex* cf. *araneus* L., 1758 in de Brabantse Kempen. *Lutra* 30:41–43
- Dolgov VA (1968) Sluchai al'binizma u obyknovnennoi burozubki. *Acta Theriol* 13:557–558 [In Russian]
- Gelling M (2003) Partial albinism in the common shrew *Sorex araneus*. *Mammal Rev* 33:189–190. <https://doi.org/10.1046/j.1365-2907.2003.00014.x>
- Grabham O (1895) Albino shrew in Yorkshire. *Zoologist Ser* 3(19):268–269
- Hollis E (1910) Albino variety of common shrew. *Zoologist Ser* 4(14):307
- Jogahara T, Ogura G, Higa G, Ishibashi O, Oda S (2008) Survey and capture of albino-like house musk shrews (*Suncus murinus*) in Okinawa, Japan, and a preliminary report regarding inheritance of the albino-like mutation. *Mammal Study* 33:121–124. [https://doi.org/10.3106/1348-6160\(2008\)33\[121:SAC0AH\]2.0.CO;2](https://doi.org/10.3106/1348-6160(2008)33[121:SAC0AH]2.0.CO;2)
- Jones TS (1962) Albinism in an African shrew (*Crocidura schweitzeri*). *Mammalia* 43:424–425
- Long CA, Gehring JA (1995) Valais-goat color pattern in a masked shrew (*Sorex cinereus*) and lack of size dependence in pigmentation patterns. *J Mammal* 76:937–939. <https://doi.org/10.2307/1382763>
- Pucek M (1964a) Cases of white spotting in shrews. *Acta Theriol* 9:367–368. <https://doi.org/10.4098/at.arch.64-39>
- Pucek Z (1964b) Rząd: Owadożerne – Insectivora. In: Kowalski K (ed) *Klucze do oznaczania kręgowców Polski. Cześć V. Ssaki – Mammalia*. PWN, Warszawa, Kraków, Poland
- Pucek Z (ed) (1981) *Keys to vertebrates of Poland. Mammals*. PWN, Warszawa, Poland
- Sealander JA (1981) Albino least shrews (*Cryptotis parva*) and a new locality record for the southeastern shrew (*Sorex longirostris*) from Arkansas. *Southwest Nat* 26:70
- Searle JB, Polly PD, Zima J (eds) (2019) *Shrews, chromosomes and speciation*. Cambridge University Press, Cambridge, UK
- Service R (1896) *Mammalia of Solway*. *Ann Scottish Nat Hist* 5:201–210
- Service R (1903) Colour variations in Solway mammals. *Ann Scottish Nat Hist* 12:65–69
- Shapiro J (1950) Notes on population dynamics of *Microtus* and *Blarina* with a record of albinism in *Blarina*. *J Wildl Manag* 14:359–360. <https://doi.org/10.2307/3796162>
- Thomas MG, Zippin J, Brooks BP (2023) Oculocutaneous albinism and ocular albinism overview. In: Adam MP, Mirzaa GM, Pagon RA et al (eds) *GeneReviews* [Internet]. University of Washington, Seattle, WA
- Wójcik JM, Wolsan M (eds) (1998) *Evolution of shrews*. Mammal Research Institute PAS, Białowieża, Poland

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