

First reported case of albinism in Montane water vole

Primer caso reportado de albinismo en rata topera

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Fur coloration is influenced by several selective pressures, such as predator evasion, inter and intraspecific communication, and physiological regulation (Caro 2005). Even so, individual fitness can be compromised by aberrant colour patterns, which may appear in the entire body or in different parts of it (Galante Rocha de Vasconcelos *et al.* 2017). Such chromatic fur disorders are determined by mutations involved on the melanin metabolic pathway (Lamoreux *et al.* 2010). This phenomenon is relatively poorly documented in wild mammal populations, so scientific reports on this issue are advisable to increase our knowledge on selection processes against these kinds of mutations. In fact, despite their diversity, uncommon pelage colour has been reported in less than 2% of the rodent species (Romero *et al.* 2018).

Albino phenotype has been observed in several Cricetid species (e.g. Romero *et al.* 2018 and references therein). Among the genus *Arvicola*, this atypical coloration was reported in a South-western water vole, *Arvicola sapidus* (Miller, 1908), from southwest Spain (Román & Laffitte 2002) and it was frequently encountered in Eurasian water voles, *Arvicola amphibius* (Linnaeus, 1758) (formerly

Arvicola terrestris; see Musser & Carleton 2005) from UK (Ryder 1962, Romero *et al.* 2018). As for the Montane (Fossorial) water vole (formerly identified as *Arvicola scherman* Shaw, 1801), white spotting on the crown of the head was observed in some specimens from French Alps, South Switzerland and Pyrenees (Stoddart 1969). Nevertheless, to my knowledge, the first case of “white” phenotype in this taxon is reported here (Fig. 1). It is worth noting that current discrepancies on phylogenetic relationships within water voles preclude to reliably following a specific taxonomic pattern. Recent morphometric and phylogenetic analyses suggest attributing fossorial specimens from mountainous habitats to *Arvicola monticola* de Selys Longchamps, 1838 (see Mahmoudi *et al.* 2020, Burgin *et al.* 2021), but it has been also suggested assembling fossorial and Eurasian water vole populations (*A. amphibius sensu lato*, Kryštufek *et al.* 2015, Chevret *et al.* 2020), in spite morphological and ecological differences (Airolidi 1976).

In the Iberian Peninsula, Montane water voles are distributed across the northern tip of Portugal, the north of Zamora and Gipuzkoa provinces, Los Ancares mountains (Galicia), the Leridan Pyrenees



Figure 1. Montane water vole with albino colour pattern captured in Los Ancares mountains, Lugo, NW Spain.

and the Cantabrian mountain range (Ventura 2007), where they may reach high population densities because of relatively-high reproductive potential (Ventura & Gosálbez 1990, Somoano *et al.* 2016). It is in Lugo province where an albino specimen of this species was captured on 25th December 2018 in a meadow intended for mowing (UTM 29T 649619 4733990; 1,205.7 m.a.s.l.) located in Triacastela municipality, Lugo province (Galicia, NW Spain). This specimen showed white to grey coat and pinkish skin; but eye colour was unfortunately not registered. Some subsequent specimens captured in this area (5 km around) showed visible white spots. According to Ventura (1992, 2007), the back of the body of fossorial water voles generally varies from dark brown or yellowish brown to ash grey, and the flanks from yellowish brown to light grey; greyish colours predominate in the ventral region, either mixed with yellow, ochre, black or white. The tail is generally bicolour, with the ventral part lighter than the dorsal one. Juveniles have darker fur than adults. Notwithstanding, coat coloration may vary between populations. No case of albinism was reported from other studies based on wide samples of specimens from the Pyrenees (Ventura 1988) and the Cantabrian mountains (Somoano 2017).

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References

- Airoldi J.P. 1976. Le terrier de la forme fouisseuse du campagnol terrestre, *Arvicola terrestris scherman* Shaw (Mammalia, Rodentia). *Zeitschrift für Säugetierkunde*, 41: 23-42.
- Burgin C.J., Wilson D.E., Mittermeier R.A., Rylands A.B., Lacher T.E. & Sechrest W. 2021. *Illustrated Checklist of the Mammals of the World. Vol. 1: Monotremata to Rodentia*. Lynx Edicions, Barcelona. 631 pp.
- Caro T. 2005. The adaptive significance of coloration in mammals. *BioScience*, 55: 125-136. DOI: [10.1641/0006-3568\(2005\)055\[0125:TASOCI\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2005)055[0125:TASOCI]2.0.CO;2)
- Chevret P., Renaud S., Helvacı Z., Ulrich R.G., Quéré J.P. & Michaux J.R. 2020. Genetic structure, ecological versatility, and skull shape differentiation in *Arvicola* water voles (Rodentia, Cricetidae). *Journal of Zoological Systematics and Evolutionary Research*, 58:1323-1334. DOI: [10.1111/jzs.12384](https://doi.org/10.1111/jzs.12384)
- Galante Rocha de Vasconcelos F., Hauzman E., Dutra Henriques L., Kilpp Goulart P., de Faria Galvão O., Sano R., da Silva Souza G. *et al.* 2017. A novel nonsense mutation in the tyrosinase gene is related to the albinism in a capuchin monkey (*Sapajus apella*). *BMC Genetics*, 18: 39. DOI: [10.1186/s12863-017-0504-8](https://doi.org/10.1186/s12863-017-0504-8)
- Kryštufek B., Koren T., Engelberger S., Horváth G.F., Purger J.J., Arslan A., Chisamera G. & Murariu. D. 2015. Fossorial morphotype does not make a species in water voles. *Mammalia*, 79 (3): 293-303. DOI: [10.1515/mammalia-2014-0059](https://doi.org/10.1515/mammalia-2014-0059)
- Lamoreux M., Delmas V., Laure L. & Bennett D. 2010. *The color of mice. A model genetic network*. Wiley-Blackwell, Texas, USA.
- Mahmoudi A., Maul L.C., Khoshyar M., Darvish J., Aliabadian M. & Kryštufek B. 2020. Evolutionary history of water voles revisited: Confronting a new phylogenetic model from molecular data with the fossil record. *Mammalia*, 84 (2): 171-184. DOI: [10.1515/mammalia-2018-0178](https://doi.org/10.1515/mammalia-2018-0178)
- Musser G.G. & Carleton M.C. 2005. *Arvicola* Lacépède, 1799; *Arvicola amphibius* (Linnaeus, 1758); *Arvicola scherman* (Shaw, 1801). In: Wilson D.E. & Reeder D.M. (eds). *Mammal Species of the World. A Taxonomic and Geographic Reference, 3rd ed*, pp. 963-966. Johns Hopkins University Press, Baltimore, USA.
- Román J. & Laffitte R. 2002. Anomalías pigmentarias en la rata de agua (*Arvicola sapidus sapidus* Millar, 1908). *Galemys*, 14 (1): 39-46.
- Romero V., Racines-Márquez C.E. & Brito J. 2018. A short review and worldwide list of wild albino rodents with the first report of albinism in *Coendou rufescens* (Rodentia: Erethizontidae). *Mammalia*, 82 (5): 509-515. DOI: [10.1515/mammalia-2017-0111](https://doi.org/10.1515/mammalia-2017-0111)
- Ryder S.R. 1962. *Water voles. Animals of Britain 4*. Sunday Times Book Publication, London, UK.
- Somoano A. 2017. *Biology and population genetics of Arvicola scherman cantabriae (Rodentia, Arvicolinae)*. PhD dissertation, University of Oviedo, Spain.
- Somoano A., Miñarro M. & Ventura J. 2016. Reproductive potential of a vole pest (*Arvicola scherman*) in Spanish apple orchards. *Spanish Journal of Agricultural Research*, 14 (4), e1008 12 pp. DOI: [10.5424/sjar/2016144-9870](https://doi.org/10.5424/sjar/2016144-9870)
- Stoddart D. 1969. Frequency of unusual albinism in water vole populations. *Notes from the Mammal Society*. 18: 222-224.
- Ventura J. 1988. *Contribución al conocimiento del género Arvicola Lacépède, 1799, en el nordeste de la Península Ibérica*. PhD dissertation, University of Barcelona, Spain.
- Ventura J. 1992. Coats and moults in *Arvicola terrestris* from the northeast of Iberian Peninsula. *Zoologische*

*Abhandlungen. Staatliches Museum für Tierkunde
Dresden*, 47: 95-110.

- Ventura J. 2007. *Arvicola terrestris* Linnaeus, 1758. Pp. 449-451. En: L.J. Palomo, J. Gisbert & J.C. Blanco (eds). *Atlas y Libro Rojo de Los Mamíferos Terrestres de España*. Dirección General para la Biodiversidad-SECEM-SECEMU, Madrid, España.
- Ventura J. & Gosálbez J. 1990. Reproduction Potential of *Arvicola terrestris* (Mammalia, Rodentia) in the

Northeast of the Iberian Peninsula. *Zoologischer Anzeiger*, 225: 45-54.

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