

## Note

### A successfully breeding, partially leucistic American Robin (*Turdus migratorius*)

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#### Abstract

American Robin (*Turdus migratorius*) is the most abundant and broadly distributed thrush in North America. Both sexes likely engage in mate choice, and there is some evidence of assortative mating based on breast colour in this species. Over two breeding seasons, we documented a case of partial leucism, primarily of the breast feathers, in a male American Robin in London, Ontario, Canada. We report evidence that the leucistic robin was capable of successful breeding. How the fitness of leucistic versus normal robins compares and how leucism influences mate choice in this and other species remain to be explored.

Key words: Ornithology; colouration; leucism; sexual selection; fitness; breeding; American Robin; *Turdus migratorius*

The colouration of birds is a result of light interacting with either the nanostructure of the integument or cellular pigments, and sometimes a combination of the two (Prum 2006). In birds, melanin is the most common pigment. A variety of feather and skin colour is attributable to two forms of melanin, eumelanin (grey to black colours) and pheomelanin (some yellows and reds, and browns by admixture of eumelanin). The other major source of pigments in birds is carotenoids derived from their diet. Melanins are not derived from food but are produced by animals endogenously. Early in embryonic development, neural crest-derived melanoblasts migrate to the skin and the newly forming feathers. The melanoblasts differentiate into melanocytes and begin synthesizing melanin by the end of the first week of development (Bharti *et al.* 2006; McGraw 2006).

A multitude of mutations can cause white feathers where there should be feathers coloured by pigments, and there is much confusion in the literature and among birders about the correct names for such colour aberrations. We follow van Grouw (2006, 2013), who provided a summary of the most frequently occurring colour aberrations and a much-needed guide to standardize their naming. Leucism is defined as the partial or total lack of both melanins in feathers and skin as a result of the heritable failure of melanoblasts

to migrate to the proper area of the body. Melanocytes and the resulting colours are absent in those areas, and the feathers appear white. Birds may be partially leucistic, with only some white feathers, or totally leucistic, with all white feathers. Importantly, melanocytes and eye pigment cells differ in their embryological origin and leucistic birds have normally coloured eyes (Bharti *et al.* 2006; van Grouw 2013).

Wild birds with leucism may face a number of challenges; however, evidence of a detrimental effect of leucism is inconclusive. In one study, the mortality of leucistic young was double that of young with normal plumage (Reese 1980). In another, a leucistic adult was not accepted into a conspecific group (Corrêa *et al.* 2017). In contrast, a leucistic adult was frequently accompanied by conspecifics in another study (Cestari and Vernaschi Vieira da Costa 2007). Several studies report no evidence that leucism affects adult breeding performance (Owen and Skimmings 1992; Forrest and Naveen 2000).

American Robin (*Turdus migratorius*) is North America's largest, most abundant, and widely distributed thrush. Typically, adult male American Robins have deep greyish to dark-brown upper parts, a blackish head, white crescents above and below the eye, white undertail coverts, and, in most eastern populations, white tips on the outer retrices. The under

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parts and breast are a rich rufous colour (Vanderhoff *et al.* 2016; Figure 1a,b). Females appear similar but with a paler grey crown and mantle, more white on the ventrum, and a paler breast (Figure 1a,b). Adult plumages vary little throughout the year; however, males have darker crowns, less white on the ventrum, and darker breasts in spring compared with autumn (Vanderhoff *et al.* 2016).

There is great interest in documenting the behaviour of leucistic birds to further understand the effects of aberrant plumages and the diverse roles plumage colouration plays in the lives of birds. Here we present evidence of a partially leucistic male American Robin successfully breeding on a ~0.2-ha private property in northwest London, Ontario (43.00°N, 81.29°W) during the 2016 and 2017 breeding seasons.



**FIGURE 1.** American Robin (*Turdus migratorius*). a, b. Male (top) and female specimens showing normal plumage colouration, collected in Strathroy, Ontario, 1932, Western University Zoological Collections: a. dorso-lateral view; b. ventral view. c–e. Partially leucistic male American Robin, London, Ontario: c. 30 June 2016, d. 27 May 2017, e. 5 June 2017. f. American Robin embryo, below nest site of partially leucistic robin, 18 June 2017. Photos: Nina M. Zitani.

Beginning in late spring 2016, a male American Robin with aberrant white feathers and normal eye colouration was observed multiple times. A photo of the robin was taken on 30 June 2016 (Figure 1c). Later in the summer, the leucistic robin was observed mating with a female of normal plumage and subsequently feeding a fledgling on a lawn. In 2017, the leucistic robin was first observed on 23 April. Over the course of the spring, the robin was observed repeatedly, and photos were taken on 27 May 2017 (Figure 1d) and 5 June 2017 (Figure 1e). By early June, the leucistic robin and a mate with normal colouration were observed bringing nest materials into a large, woody climbing hydrangea (*Hydrangea* sp.). On 18 June 2017, a nearly fully developed embryo was found smashed on a rock below the nest site (Figure 1f). Throughout the season, several Brown-headed Cowbirds (*Molothrus ater*) were observed in the area. On 5 August 2017 at 2000, the leucistic robin was observed on a lawn 0.25 m from a vocalizing fledgling. Shortly thereafter, the leucistic robin approached and fed the fledgling. On several occasions, the leucistic robin was observed singing normally.

The plumage colouration of this leucistic robin was as follows: the typically greyish upperparts of the body were mixed with patches of white, particularly on the mantle and lesser, median, and greater coverts. There appeared to be a greater-than-normal proportion of white around the eye and throat. The usually rich rufous breast was heavily marked by white feather patches. The eyes of the robin were black. The lack of colouration in typically pigmented areas that we observed in this bird and normally coloured eyes are characteristic of partial leucism (van Grouw 2006, 2013). Because of the characteristic markings of this bird, we were confident in all cases that our observations were of the same individual (Figure 1c–e).

The occurrence of leucism in natural populations of wild birds rarely exceeds 1% (Bensch *et al.* 2000). Gross (1965) reported that American Robin had the highest rate (8.2%) of “albinism” among North American birds he surveyed; his tally included not only leucism but all forms of pale aberrations. When strictly defined, leucism in American Robin has been reported less often than albinism and melanism (Vanderhoff *et al.* 2016).

Plumage colouration has long been associated with sexual selection (Darwin 1871), with females typically preferring brightly coloured males (e.g., Safran *et al.* 2005), likely because plumage is often condition-dependent (Hamilton and Zuk 1982). Leucistic birds may appear duller or less attractive to prospective mates and, consequently, may have lower reproductive success and overall fitness compared

with normally-coloured individuals, especially those with brightly coloured plumage.

In species where the sexes share the same traits (e.g., breast colour in American Robin), mutual sexual selection can occur if both sexes benefit from discriminating among potential mates based on these traits (Rowe and Weatherhead 2011). The partially leucistic male robin we observed had a large proportion (~40–50% of breast area) of white feathers on his breast. To our knowledge, there are no data on how leucism might influence mate preference in American Robin; however, because robins apparently exhibit positive assortative mating with respect to breast colour (Rowe and Weatherhead 2011), we expect this leucistic male would be more likely to mate with a paler female.

In conclusion, our report documents a rare case of partial leucism in American Robin, and provides evidence that leucistic robins are capable of successful breeding. How the fitness of leucistic versus normal robins compares remains to be explored. Given the mixed results in the literature on the impacts of leucism, more studies are needed to understand the maintenance of leucism in natural populations and the impacts of this plumage abnormality on wild birds.

### Author Contributions

Writing – Original Draft: N.Z. and L.G.; Writing – Review & Editing: N.Z., L.G., and R.G.T.; Conceptualization: N.Z.; Investigation: N.Z. and R.G.T.

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### Literature Cited

- Bensch, S., B. Hansson, D. Hasselquist, and B. Nielsen. 2000. Partial albinism in a semi-isolated population of Great Reed Warblers. *Hereditas* 133: 167–170. <https://doi.org/10.1111/j.1601-5223.2000.t01-1-00167.x>
- Bharti, K., M.T. Nguyen, S. Skuntz, S. Bertuzzi, and H. Arnheiter. 2006. The other pigment cell: specification and development of the pigmented epithelium of the vertebrate eye. *Pigment Cell Research* 19: 380–394. <https://doi.org/10.1111/j.1600-0749.2006.00318.x>
- Cestari, C., and T. Vernaschi Vieira da Costa. 2007. A case of leucism in Southern Lapwing (*Vanellus chilensis*) in the Pantanal, Brazil. *Boletín SAO* 17: 145–147.
- Corrêa, L.L.C., N. Horn, C. dos Santos Bruckmann, and M.V. Petry. 2017. Leucism in *Vanellus chilensis*



- (Molina, 1872) (Birds: Charadriiformes) in Pampa biome, southern Brazil. *Oecologia Australis* 21: 219–221. <https://doi.org/10.4257/oeco.2017.2102.14>
- Darwin, C.** 1871. *The Descent of Man, and Selection in Relation to Sex*. John Murray, London, United Kingdom.
- Forrest, S.C., and R. Naveen.** 2000. Prevalence of leucism in pygocelid penguins of the Antarctic Peninsula. *Waterbirds* 23: 283–285.
- Gross, A.O.** 1965. The incidence of albinism in North American birds. *Bird-Banding* 36: 67–71.
- Hamilton, W.D., and M. Zuk.** 1982. Heritable true fitness and bright birds: a role for parasites? *Science* 218: 384–387. <https://doi.org/10.1126/science.7123238>
- McGraw, K.J.** 2006. Mechanics of melanin-based coloration. Pages 243–294 in *Bird Coloration Volume 1. Mechanisms and Measurements*. Edited by G.E. Hill and K.J. McGraw. Harvard University Press, Cambridge, Massachusetts, USA.
- Owen, M., and P. Skimmings.** 1992. The occurrence and performance of leucistic Barnacle Geese *Branta leucopsis*. *Ibis* 134: 22–26. <https://doi.org/10.1111/j.1474-919X.1992.tb07224.x>
- Prum, R.O.** 2006. Anatomy, physics, and evolution of structural colors. Pages 295–353 in *Bird Coloration Volume 1. Mechanisms and Measurements*. Edited by G.E. Hill and K.J. McGraw. Harvard University Press, Cambridge, Massachusetts, USA.
- Reese, J.G.** 1980. Demography of European mute swans in Chesapeake Bay. *Auk* 97: 449–464.
- Rowe, K.M., and P.J. Weatherhead.** 2011. Assortative mating in relation to plumage traits shared by male and female American Robins. *Condor* 113: 881–889. <https://doi.org/10.1525/cond.2011.100207>
- Safran, R.J., C.R. Neuman, K.J. McGraw, and I.T. Lovette.** 2005. Dynamic paternity allocation as a function of male plumage color in barn swallows. *Science* 309: 2210–2212. <https://doi.org/10.1126/science.1115090>
- Vanderhoff, N., P. Pyle, M.A. Patten, R. Sallabanks, and F.C. James.** 2016. American Robin (*Turdus migratorius*), Version 2.0. In *The Birds of North America*. Edited by P.G. Rodewald. Cornell Lab of Ornithology, Ithaca, New York, USA. <https://doi.org/10.2173/bna.462>
- van Grouw, H.** 2006. Not every white bird is an albino: sense and nonsense about color aberrations in birds. *Dutch Birding* 28: 79–89.
- van Grouw, H.** 2013. What color is that bird? The cause and recognition of common color aberrations in birds. *British Birds* 106: 17–29.

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