

Aberrant Coloration in Canadian Eastern Chipmunks, *Tamias striatus*

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Abstract. Seven aberrantly colored eastern chipmunks (*Tamias striatus*), three melanistic, two albinistic, one with a white dorsolateral patch, and one with dilute pigmentation, from Ontario and Quebec are described.

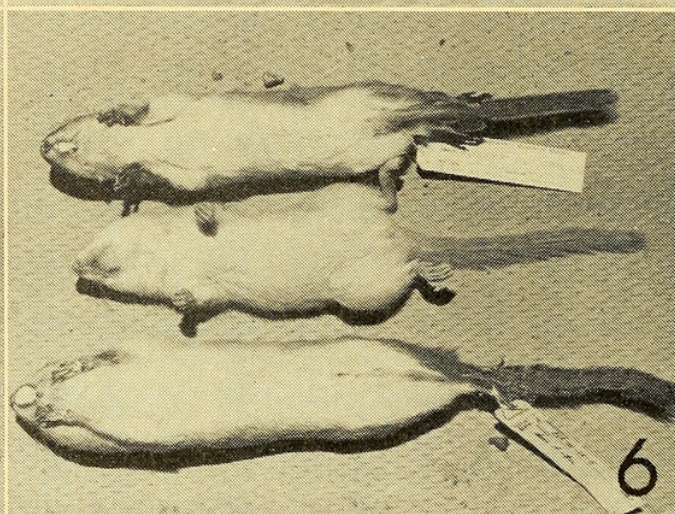
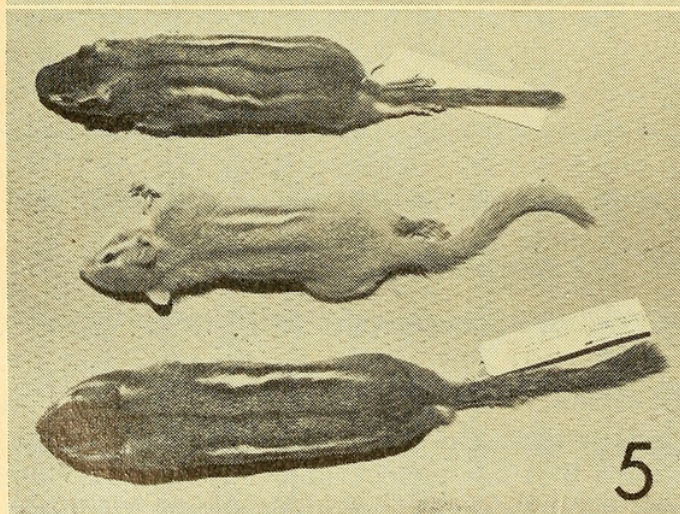
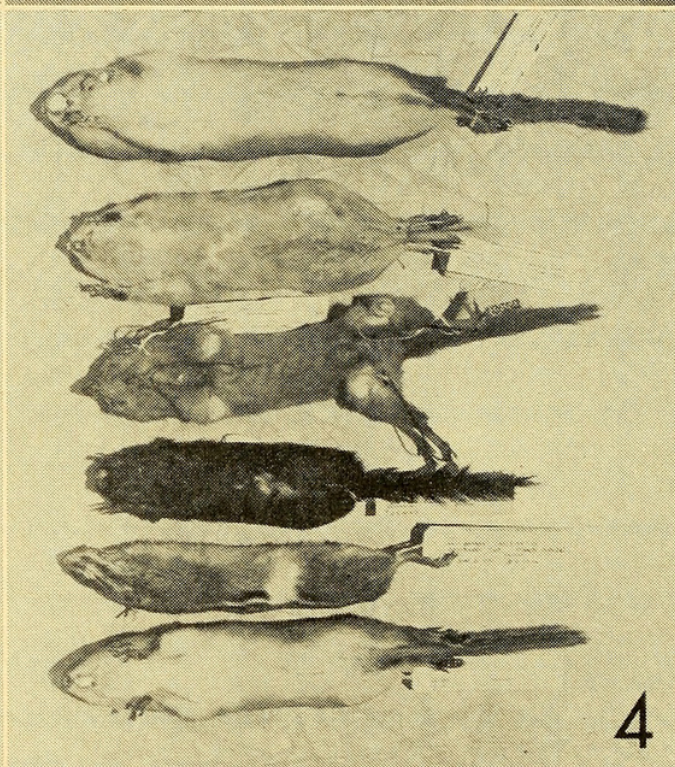
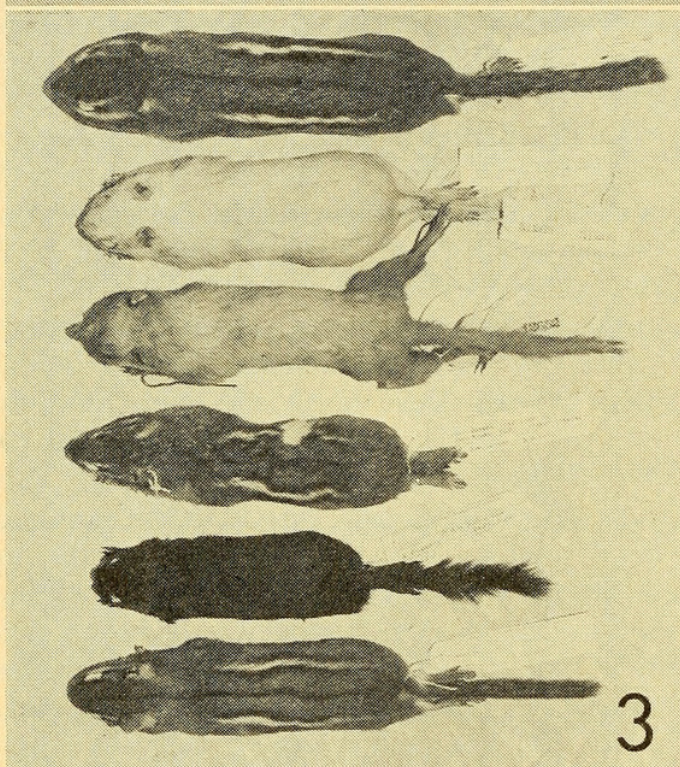
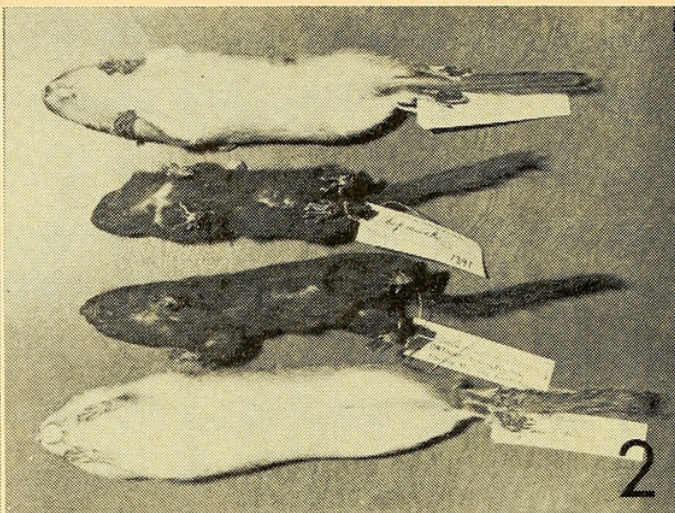
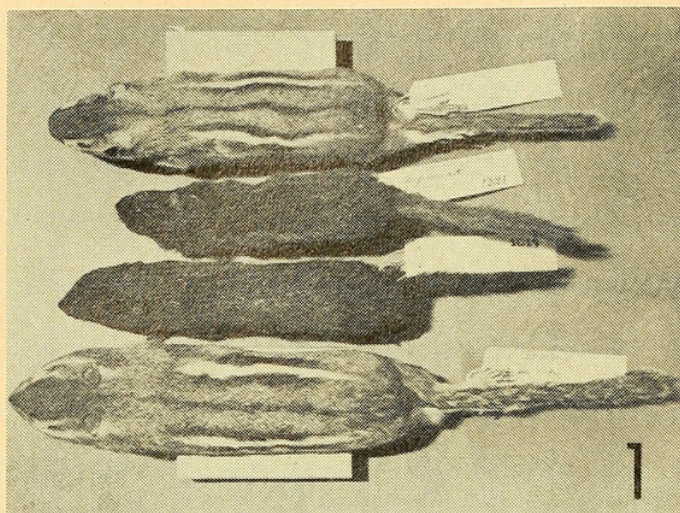
Most of the few published reports of melanism, albinism and other aberrant colorations in eastern chipmunks have originated in the United States. Allen (1938) reviewed most of the scant earlier literature and described two abnormally pigmented chipmunks. Subsequently Stegeman (1960) reported a melanistic chipmunk, and Zinn (1954) and Hough and Smiley (1963) reported albinos. In addition Mossman (1931) described the graying of the fur of four young chipmunks. We know of only one report (by Adams, 1873) of abnormal coloration in Canadian eastern chipmunks. Indeed color aberrations appear to be rare throughout the range of this species.

We examined about 1,450 Canadian chipmunk specimens in the Royal Ontario Museum, Toronto (ROM); National Museum of Natural Sciences, Ottawa (NMNS); and Carleton University Museum of Zoology, Ottawa (CUMZ). We also made some field observations on other mutants. Seven aberrantly colored eastern chipmunks were photographed with two normally pigmented specimens as reference standards. Both the latter were collected on the eastern outskirts of Ottawa, Ontario. CUMZ 2990, the smaller of the two reference specimens in Figures 1 to 6, is an adult female and CUMZ 2996, the larger, is an old adult male whose skin was somewhat stretched in preparation. Our age-class determinations and estimates of the approximate dates of birth of the chipmunks described are based on the criteria in Smith and Smith (1972).

Melanistic Chipmunks

We examined three melanistic chipmunks. NMNS 1391, shown in Figures 1 and 2, was collected on September 13, 1907 near Kingsmere, Gatineau County, Quebec. Other data were not recorded. The specimen is a mounted skin; its small size and the date of collection suggest that it was a young animal born in mid-summer. Its dorsal surface is basically dark brown, darkest on the upper back and more rust-colored towards the lower back. The dark brown hairs are ashy gray at their bases. Barely visible because of the abnormally dark ground color are the single black mid-dorsal line, the two pairs of black dorsolateral lines and the three dark facial stripes. The ordinarily light buff dorsolateral and facial stripes are still faintly visible because buff bands below the tips of the dark hairs give the appearance of fine buff speckling. Also basically dark brown with faint buff speckling are the sides and ventral surface. A longitudinal white throat patch about 22×4 millimeters is visible in Figure 2. The transverse white area on the throat and that on the mid-belly, both also seen in Figure 2, are artefacts, being merely stuffing material showing through rips in the skin. The tail is almost normal, differing from that of CUMZ 2290 only in having fewer hairs with buffy tips and in being duller ventrally.

NMNS 1019 is a mounted skin with skull enclosed of a female collected February 10, 1902 at Norway Bay Park, Ontario by David McFarlane. The early date of collection and large size suggest that it is an adult. Figures 1 and 2 show that it is almost uniformly dark including its tail. Its hairs are dark brown with gray bases. Close inspection reveals the black mid-



dorsal line. Slightly lighter brown hairs indicate the position of the ordinarily light dorsolateral lines. There is a small white spot on the chin, another on the chest and a few isolated white hairs on the sides.

Both these melanistic chipmunks (NMNS 1019 and 1391) are mounted specimens that may have been on display for some time after preparation. Thus their pelage may have faded or 'foxed' considerably from the original dark color. In contrast, the skin of the third melanistic chipmunk we examined, ROM 21427, shown in Figures 3 and 4, had not been displayed, and its fur is totally black. The light areas on its venter in Figure 4 are either exposed skin or stuffing material. This midsummer-born subadult female was taken on October 12, 1951 by S. Plooffe in Township 22, Sudbury District, Ontario and donated by the Ontario Department of Lands and Forests.

The only previous report of melanistic eastern chipmunks in Canada is that of Adams (1873; page 100) who saw 'several instances of melanism in this species' in New Brunswick. There are several records of melanistic chipmunks from the United States. Specimen MCZ 1592 in the Museum of Comparative Zoology at Harvard University, collected at Norway, Maine, was described by Allen (1877) as black with a narrow white streak on the breast. This appears to be similar to the marking on NMC 1391 described above. Allen (1938) examined a completely black chipmunk taken at Richford, New York on May 10, 1929, and also mentioned (page 15) that 'a few strongly melanistic specimens are . . . in the (United States) National Museum collections at Washington, D.C.'. The melanistic chipmunk reported by

Stegeman (1960) was taken at Middleville, New York about October 19, 1958. He described this male as coal-black with a few short white hairs on the back and cheeks. Its measurements suggest that it is a large young or small adult born in midsummer.

Albino Chipmunks

Figures 3 and 4 show that two albino chipmunks in the Royal Ontario Museum have no evidence of stripes nor any other pattern. The whiter of the two albinos, ROM 31269, is a male taken on October 4, 1958 by Fred Schlick at Hamilton, Ontario. Its size is within the normal adult range. Its color is a slightly buffy white, somewhat grayer with accumulated dirt on the ventral surface. The light patches on the venter in Figure 4 are areas where the fur has been lost. The dried ears and feet are considerably lighter and more translucent than those of the two normally pigmented specimens. The vibrissae are white.

The second albino, ROM 12652, was taken at Feversham, Grey County, Ontario. The date of collection is unknown but the mounted skin with skull enclosed was donated by O. E. Devitt in August, 1938. It was likely on display for some time and is now a dirty yellowish-gray, considerably darker on the ventral surface. When small areas of the tail, back, side and belly were washed with water and a mild detergent to remove the accumulated grime (after the photographs were taken), the fur in each of these places was seen to be a buffy-yellow color, considerably more intense than that of ROM 31269. The white patches seen at the base of its limbs in Figure 4 are merely stuffing

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- FIGURES 1 and 2. Dorsal and ventral views of two melanistic chipmunks between two normal specimens. From top to bottom, specimens are: CUMZ 2990, NMNS 1391, NMNS 1019, CUMZ 2996.
- FIGURE 3. Dorsal views of two albino chipmunks, one melanistic and one with a white dorsolateral patch, with two normally pigmented specimens. From top to bottom, specimens are: CUMZ 2996, ROM 31269, ROM 12652, CUMZ 5001, ROM 21427, CUMZ 2990.
- FIGURE 4. Ventral views of two albino, one melanistic and two normal chipmunk specimens, and lateral view of one specimen with a white dorsolateral patch. From top to bottom, specimens are: CUMZ 2996, ROM 31269, ROM 12652, ROM 21427, CUMZ 5001, CUMZ 2990.
- FIGURES 5 and 6. Dorsal and ventral views of a live dilute-pigmented chipmunk (temporarily etherized) between two normal specimens, CUMZ 2990 (top) and CUMZ 2996 (bottom).

material protruding through tears in the skin. The opacity of the ears and feet is intermediate between that of the whiter albino and that of the two normal specimens but tends to be more similar to the latter. The vibrissae are dark.

Allen (1938) found no records of albino chipmunks but two have appeared subsequently. Zinn (1954) reported that two albino chipmunks, one of each sex, were caught two weeks apart at South Kingstown, Rhode Island in April, 1953. They were entirely white and had pink eyes. He implied that they occupied the same burrow. If so, we would speculate that they were littermates, possibly born the previous midsummer, that overwintered together, rather than a breeding pair as Zinn implied. A white female chipmunk killed on May 14, 1961 near Kingston, New York, was reported by Hough and Smiley (1963). Its measurements, weight and date of capture indicate that it was an adult. It had pink eyes and although its general color was white, it had irregular patches of cream to buffy brown on the head, back and the dorsal aspect of the tail.

Other Aberrantly Colored Chipmunks

We observed two abnormally pigmented eastern chipmunks in the vicinity of Ottawa, Ontario. One, an old adult male, (CUMZ 5001) was live-trapped at Stanley Corners almost daily from April 20 to June 26, 1970. Its pelage was normal until June 9 when we noticed a small patch of bare skin on the right side. The bare patch increased in size, and on June 23 white fur was observed in the area. By June 26, when the animal died accidentally, the 15 × 25 millimeter patch was fully covered with pure white fur (Figures 3 and 4). The factors that caused this chipmunk to lose some of its fur and then grow in white replacement fur very rapidly are not known. All of the many other chipmunks live-trapped in this woods during the past four years, including a litter of five fathered by this aberrant male, were normal in color and pattern. We encountered only one previous record of a chipmunk with a white spot; one of Allen's (1938) New York specimens had a white spot located posteriorly in the left dorsal stripe.

The second aberrant chipmunk we observed was normal in pattern but all its colors were considerably diluted, so that it was very pale indeed. Figures 5 and 6 show how much paler it was than the two normal chipmunks collected within two miles of its birthplace. The general dorsal and lateral color was pearly gray with buffy overtones, with white and 'washed-out' brown stripes. The ventral surface was white. Both the dorsal and ventral sides of the tail were the same frosty grayish brown, slightly browner than the back. The vibrissae were whitish, and the nose, snout, lips, chin and feet distinctly bright pink. Its eyes were dark reddish-brown, lighter than the eyes of normal live chipmunks but much darker than the red or pink eyes of albinos.

This pale female chipmunk was in a litter of six which emerged from a burrow in a suburban Ottawa garden in June 1971. Three young were normally pigmented like their mother and three were identically pale. A midsummer litter produced by the same female contained only normally pigmented young. We speculate that the lack of normal melanin complements in the pale chipmunks must be due to their genetic make-up and that a 'white' or 'beige' chipmunk seen in the neighbourhood by others during 1970 and 1971 may have sired the spring litter containing the pale offspring.

Reports of dilute coloration in eastern chipmunks are very scarce. Allen (1877) reported that MCZ 1568 from Maine had pale, obscure stripes; this specimen may be similar in some respects to the live pale chipmunk we examined. Mossman (1931) described changes in the pigmentation of four young chipmunks from the normal colors to silver gray with dull stripes after six or more weeks in a cage in direct sunlight. He thought that moulting was involved in this color change, and that direct sunlight was the probable causative agent. His animals lost the hair on their tails as they became grayer and at least three of them died shortly thereafter. His observations have apparently never been duplicated nor satisfactorily explained. The Ottawa area case is a different one for the dilute individuals were pale and healthy when they emerged from their natal burrow and ap-

peared so for the ensuing two months of observation. This appears to be the first report of what is probably a genetically controlled dilution of the normal pigmentation in *Tamias striatus*.

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