

SHORTER CONTRIBUTIONS

UNUSUAL PELAGE PIGMENTATION IN *PEROMYSCUS MANICULATUS* (WAGNER, 1845) IN SMYTH COUNTY, VIRGINIA

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ABSTRACT

As part of an education demonstration in Smyth County, Virginia, we captured an adult male deer mouse, *Peromyscus maniculatus* (Wagner, 1845), with an unusual pelage pigmentation. Rather than the lighter brown adult coloration beginning on the anterior end with a progression toward the shoulders and head, this individual appeared to maintain the dark gray juvenile pigmentation on the dorsal, anterior portion of his body, with the adult coat coming in first roughly around the shoulders and forelimbs. This find was atypical of a typical juvenile-to-adult molting pattern. We provide photographic evidence of the unusual find and examine previous reports of unusual pelage patterns in this genus. Though the genetic basis for the pelage anomalies has been relatively well-documented and is rare, we discuss several external factors that could be at work in this region, some of which could signal a larger potential shift in selection for this species.

Keywords: Anomaly, coat coloration, deer mouse.

As part of the spring Mount Rogers Naturalist Rally, an educational demonstration aimed to encourage public support for natural history, we deployed 170 Sherman (LFA 7.62 x 8.89 x 22.86 cm) live traps (H.B. Sherman Traps, Tallahassee, FL) on 12 May 2023 along the Mount Rogers hiking trail (ca. 36.687187 °N, 81.540179 °W). Here, this trail traverses Grindstone Campground in Smyth County. We baited traps with a mixture of old-fashioned rolled oats, commercial birdseed, and commercial molasses-covered goat feed. While checking these traps with members of the public on the morning of 13 May 2023, we captured an adult male deer mouse, *Peromyscus maniculatus* (Wagner, 1845), (total length = 165 mm, tail length = 85 mm,

hind foot length = 18 mm, ear length = 15 mm, weight = 18 g) with an unusual pelage coloration (Fig. 1). This individual exhibited the coat of a juvenile (slate gray) on the hindlimbs and dorsal, posterior two-thirds of the body, and adult (light brown) fur on the head, forelimbs, and anterior one-third of the dorsum. His ventral fur was white and unremarkable, as is typical for all age classes of *P. maniculatus*.



Figure 1. Adult male *Peromyscus maniculatus* captured on 13 May 2023 in Smyth Co., Virginia. Photos taken from a variety of aspects to visualize the extent of a pelage anomaly.

This atypical pelage pigmentation is not the expected color change from juvenile to adult. Collins (1919) pictorially described that molting in this genus generally begins at the anterior end and traverses predictably towards the posterior end. Specifically, on the dorsal side, it begins near the shoulders; then the adult pelage coalesces at the shoulder girdle and progresses towards the ears. The final molt to the adult pelage progresses laterally and posteriorly (Collins, 1919). In our specimen, the area between the shoulders is slate or gun-metal gray (slightly darker than the typical juvenal pelage) while the head possesses adult pelage coloration. In brief, no other *Peromyscus* has this coloration on the back. Gottschang (1956) studied juvenal molting patterns in *Peromyscus leucopus* (Rafinesque, 1818) (white-footed mice) and described molting along the lateral sides first, with waves of adult pelage pinching in towards the center of the dorsum until both sides met. Golley et al. (1966) describe a similar pattern that begins laterally in *Peromyscus polionotus*

(Wagner, 1843) (oldfield mouse). In each case, the hind legs and hind end attain adult colors symmetrically, with the mid-dorsal line molting last. Our anomalous specimen does not conform to this pattern.

The unusual coloration in this deer mouse could be influenced by several internal or external factors working alone or in tandem with one another. Typically, unusual coloration is due to random genetic mutations or mutations resulting from genetic isolation (Kingsley et al., 2009; Camargo et al., 2014), congenital disorders (Camargo et al., 2014), or hormonal fluctuations (Brown, 1963). There is also a possibility of damaged hair follicles either from birth or in response to a traumatic event (Golley et al., 1966; Camargo et al., 2014), but this is unlikely given the large area of different coloration. Divergence from typical coloration patterns could be a disadvantage if it makes the individual more conspicuous to predators; however, it is suspected that this adult specimen has already survived one winter to reach adulthood.

If this adult male kept this pelage pattern over the winter, it could be an indication that the darker color on his dorsal side was advantageous. Given the high level of environmental adaptability and plasticity exhibited by *Peromyscus* species (Camargo et al., 2014), maintaining darker juvenile fur could be a response to climate change and steadily decreasing mean winter temperatures (a thermoregulatory response to absorb more heat than a lighter shade; Golley et al., 1966; Tabacaru et al., 2011). Another possibility is that this is a response to resource scarcity, saving the individual energy by avoiding an extra molt (Tabacaru et al., 2011). A less likely explanation for this pattern is that the individual was partially melanistic, and that a decrease in the production of melanin has resulted in the unusual introduction of lighter pelage (as suggested by Kingsley et al., 2009).

Unique finds in the genus are not without precedence and include leucistic (white spotting, blotching, or wholly white due to lack of pigment) individuals (Camargo et al., 2014) in the wild. Melanism (darker-than-typical hairs due to an overabundance of pigment) also has been well-studied in the genus (e.g., Kingsley et al., 2009). The *Peromyscus* Genetic Stock Center at the University of South Carolina formerly maintained captive-bred populations of *P. maniculatus* and congeners with unusual pelage patterns such as blond, albino, silver, and agouti (*Peromyscus* Genetic Stock Center, 2008). However, this perceived incomplete molt from a juvenile-to-adult appears unreported in the literature, and anomalous specimens are absent from the Virginia Museum of Natural History (N. Moncrief, VMNH, personal communication).

Due to our goals as an educational demonstration and limitations under the Radford-University-approved IACUC protocol (FY21-05), we released this individual alive and unharmed at the point of capture. Had we collected this individual to prepare as a museum study skin, we would have been able to observe its molting pattern in the everted skin (e.g., Golley et al., 1966), and contributed it as a specimen to the Virginia Museum of Natural History. Nevertheless, the photographs of the specimen depict a unique, anomalous pelage pattern that is worth continued study around Mount Rogers and elsewhere in the Commonwealth.

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