

Notes

Records of Melanistic American Red Squirrels (*Tamiasciurus hudsonicus*) from Nova Scotia

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Though melanism has been observed in several species of North American sciurids, the occurrence of this phenotype is relatively rare in American Red Squirrels (*Tamiasciurus hudsonicus*). We provide the first detailed accounts of melanistic Red Squirrels observed in Nova Scotia, Canada.

Key Words: American Red Squirrel, *Tamiasciurus hudsonicus*, Melanism, Nova Scotia.

Melanism in mammals refers to black or very dark brown pelage (Caro 2005), and is a relatively uncommon phenotype observed in most species of mammals (Guthrie 1967). While most populations exhibit gradual intraspecific colour variation across their geographic range, there are some populations that show discontinuous variation (Caro 2005), with melanistic (melanic) individuals occurring at high frequency (Guthrie 1967). For example, some populations of Eastern Gray Squirrel (*Sciurus carolinensis*) (hereafter Gray Squirrel) in northern latitudes are comprised almost entirely of melanistic individuals (Banfield 1974; Hall 1981; Thorington and Ferrell 2006).

Melanism has been reported in other North American sciurids [e.g., Eastern Fox Squirrel (*Sciurus niger*) (Kiltie 1989); Arctic Ground Squirrel (*Spermophilus parryii*) (Guthrie 1967); Eastern Chipmunk (*Tamias striatus*), Yellow-Bellied Marmot (*Marmota flaviventris*), Black-Tailed Prairie Dog (*Cynomys ludovicianus*), Thirteen-Lined Ground Squirrel (*Spermophilus tridecemlineatus*) (Thorington and Ferrell 2006)]. Melanistic American Red Squirrels (hereafter Red Squirrel), *Tamiasciurus hudsonicus*, are rarely encountered in the wild (Allen 1898; Layne 1954; Benton 1958; Steele 1998) considering the high abundance of this species over its large geographic range (Young, 1999). In this paper, we report the first records of melanistic Red Squirrels from Nova Scotia, Canada.

On March 6, 2010, the first author observed a melanistic adult Red Squirrel in Kentville Ravine, Nova Scotia (45°07'69"N, 64°49'44"W), foraging near a stand of White Spruce (*Picea glauca*). Though melanistic Gray Squirrels are known to occur in the Annapolis Valley of Nova Scotia (Huynh et al. 2010), the body size of this animal was too small to be that

of a typical adult Gray Squirrel. The presence of other external characters – i.e., hair tufts protruding from the top of the pinnae (more accentuated in winter pelage; Steele 1998; Whitaker and Hamilton 1998) and smaller, flatter tail (Steele 1998) – also confirmed that this animal was a Red Squirrel.

On March 22, 2010, the second author observed and photographed a young adult melanistic Red Squirrel (Figures 1A and B) in Upper Nine Mile River, Nova Scotia (Fraser Road; 44°69'41"N, 63°59'00"W). The animal was foraging near a stand of White Spruce. Another melanistic Red Squirrel was also observed by the second author in the Upper Nine Mile River region (Ess Road; 44°69'41"N, 63°59'00"W) on January 12, 2008, but it is uncertain whether these 2 sightings are of the same individual.

An earlier record of a melanistic Red Squirrel in Nova Scotia was brought to our attention by Fred Scott (Acadia Wildlife Museum) and Mark Elderkin (Nova Scotia Department of Natural Resources). A young subadult melanistic Red Squirrel was collected from Melanson Kings Co., Nova Scotia, by Ivan M. Levy (owner and operator of the S. G. Levy and Sons Ltd. sawmill) on June 11, 1983 and deposited in the mammal collection at the Acadia Wildlife Museum (Catalogue Number MA 1847; Figure 2). This voucher was one of several melanistic young individuals observed from the same litter (M. Elderkin, personal communication). Recorded external measurements from the attached tag for this specimen are as follows: total length = 225.0 mm; tail length = 110.0 mm; hindfoot length = 40.0 mm; ear length = 19.0 mm; mass = 47.8 g.

Although Banfield (1974) stated that melanism is “occasionally seen” in Red Squirrels, he did not cite any references that supported this claim. Upon review



FIGURE 1A & B. A young adult, melanistic American Red Squirrel (*Tamiasciurus hudsonicus*) observed foraging in Upper Nine Mile River, Nova Scotia. Photos by Rita Viau (A) and Bernard Burke (B).



FIGURE 2. A subadult melanistic American Red Squirrel (*Tamiasciurus hudsonicus*) collected from Melanson Kings Co., Nova Scotia deposited in the mammal collection at the Acadia Wildlife Museum (Catalogue Number MA 1847). Photo by Howard Huynh.

of the scientific literature, the paucity of relevant sightings and reports seems to suggest that melanism is actually a rare phenotype in Red Squirrels. Layne (1954) stated that “abnormal color variants are uncommon in the red squirrel” and that “melanic specimens are rare.” Likewise, Woods (1980) commented that “melanistic Red Squirrels are rarely encountered.” Steele (1998), although citing a few reports of melanistic Red Squirrels, noted that pelage aberrations of any kind are relatively rare in this species. Benton (1958), who reported 4 melanistic Red Squirrels (presumably all from the same litter) from New York, also commented that melanistic Red Squirrels are “apparently rare.” To our knowledge, no melanistic Red Squirrels have ever been reported from Nova Scotia, making the observations reported here the first records for the province. Interestingly, Adams (1873), who apparently made a special effort to record information on melanism (and albinism) in eastern Canadian wildlife, noted that a population comprised entirely of melanistic Red Squirrels was found on the south coast of New Brunswick. The information was provided to Adams by George Boardman, a well-known ornithologist and naturalist in the region (McAlpine 1994), but nothing in Adams (1873) suggests that Boardman observed melanistic Red Squirrels himself. Unfortunately, the precise location of the observation provided by Boardman was not recorded and no subsequent comments or information on this population have since been published (Layne 1954). None of the more recent discussions of the mammal fauna of Maritime Canada (e.g., Rand

1933, Smith 1940, Cameron 1958, Peterson 1966, Squires 1968, and Dilworth 1984) report melanism in the Red Squirrel, attesting further to the rarity of melanistic individuals of this species in this region.

Various hypotheses have been put forth in an attempt to explain the adaptive significance of melanism in sciurids. Though some experiments have shown that melanistic Gray Squirrels experience advantageous thermoregulation in cold environments (e.g., Innes and Lavigne 1979; Ducharme et al. 1989), the hypothesis of melanism conferring selective advantage in northern, colder environments has not been addressed in Red Squirrels. Considering that Red Squirrels have low thermal insulative capacity due to their small body size (Irving et al. 1955), restrict their activities to subnivean space during cold temperatures (Pruitt and Lucier 1958), and remain relatively inactive in winter (Banfield 1974), melanism may not contribute significantly to beneficial thermoregulation in this species. Mengel and Jenkinson (1971) suggested that melanism in a Red Squirrel taken from Yukon, Canada, may be attributed to fire melanism – i.e., dark individuals residing on a dark substrate, the latter resulting from burning of landscapes by fire (Guthrie 1967). However, the frequency of fire acting as a natural disturbance event in Nova Scotia forests is low due to fire suppression practices (Davis and Browne 1996). Hence, it is likely that melanism is not an adaptive polymorphism for Red Squirrels in Nova Scotia in response to fire disturbance regime. Regardless, the rarity of melanism in the Red Squirrel generally suggests that

it is not an adaptive polymorphism in this species, and that any hypothesized selective advantages associated with this phenotype (e.g., thermoregulation, camouflage, disease resistance) to Red Squirrels in Nova Scotia or elsewhere has yet to be determined.

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