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First report of partial albinism in genus *Thrichomys* (Rodentia: Echimyidae)

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ABSTRACT

Reports about albinism in rodents are common. In the family Echimyidae, however, albinism is very rare. This is the second case of coat color variation reported within Echimyidae and the first for the genus Thrichomys. *The pelages of* Thrichomys pachyurus *individuals with normal and variant coat color were observed under a fluorescent artificial light and were examined with a stereoscopic microscope. The descriptions of pelage color were based on the book "Color Standards and Color Nomenclature". The predominantly white pattern of coat color in individuals of* T. pachyurus *suggests a partial albinism caused by delay in migration time of melanoblasts from neural crest to epidermis. The habitat of* T. pachyurus *has a heavy vegetative cover, which offers natural protection against predators and high-quality nutrition.*

Key-Words: Albino; *Thrichomys pachyurus;* Neotropical; Pantanal; Coat color.

INTRODUCTION

Albinism has been reported in several species of small mammals. Among rodents, the genus *Microtus* (Cricetidae: Arviculinae) contains several species for which albinism has been described (Hays & Bingham, 1964; Barrett, 1975; Jannett Jr., 1981). On the other hand, in the family Echimyidae only one report has been related. In that study the specimen shows a white stripe in the dorsum and a narrow tuft of white hair on the head. The distal third of the tail is also white. This pattern has been reported for *Trinomys albispinus* and was thought to be a case of partial albinism (Pessôa & Reis, 1995).

In the present study we report a partially albino individual of *Thrichomys pachyurus,* and we also describe the normal pattern of pelage for this species.

Thrichomys pachyurus (Wagner, 1845) is one of the four recently recognized species of the genus *Thrichomys* Trouessart, 1880 (Pessôa *et al.,* 2004; Pessôa *et al., in press*). The karyotype described for this species shows 2n = 34 and FNa = 64 (Bonvicino *et al.,* 2002; Pessôa *et al.,* 2004). This species inhabits the Pantanal biome in southwestern Brazil, reaching also

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the Bolivian and Paraguayan Chaco (Moojen, 1952; Pessôa *et al., in press*). They have terrestrial and scansorial habits, and may use cracks in the soil as temporary shelters (Streilein, 1982; Mares *et al.,* 1986).

The skull of *Thrichomys pachyurus* is robust and differs from other species by the shape of the foramen interpremaxilar, oval, short and narrow; the strong constriction in the suture of the foramen incisive between the pre-maxilla and maxilla; and by the rectangular hamular process of pterygoid, which shows a large tip (Neves & Pessôa, 2011).

The genus *Thrichomys,* despite being allocated in the Echimyidae family, is the only cursorial genus with absence of typical spiny hair, showing a soft coat. The aristiform hair is just a little thicker than setiform hairs. The orbital region has two white spots: one above and one below the eye. The base of the ear shows a third white spot. The tail is densely hairy with long terminal hairs that increase its total length.

The coat color of this species was briefly described by Moojen (1952), but without detailing the hair color structure. In the literature there is no record of albino specimens within this genus.

In this study, we describe a rare pattern of an adult partial albino compared with the normal pelage pattern for *Thrichomys pachyurus.*

MATERIAL AND METHODS

Study area

The albino specimen (MN 63869) of *Thrichomys pachyurus* was collected in Corumbá, Mato Grosso do Sul state, Brazil, in 2001. It belongs to a sample of 18 specimens from the same locality. The entire sample is housed in the Mammal Collection of the Museu Nacional – Rio de Janeiro (MN).

The specimens examined, including a partial albino specimen, were observed under a fluorescent artificial light of 26W and 4100K. The hairs were examined with a stereoscopic microscope. The nomenclature used to describe the color of the hair was based on the book "Color Standards and Color Nomenclature", by Robert Ridgway (1912).

RESULTS

The dorsum of *Thrichomys pachyurus,* with a normal coat color pattern (Fig. 1), shows a yellowish brown central region. The lateral portion of the body is gray. The aristiform hair of the dorsum is * 2. slate black in apical and sub-apical zones, and the basal portion is * sepia. The setiform hair has the apical zone * 2. slate-black, the sub-apical zone is primuline yellow, while the median zone is 3 * blackish slate, and the basal portion is gray * 7 (gull deep gray). The aristiform hair on the lateral portion of the body, which is thinner than dorsal hair, is white in the apical zone, the sub-apical zone is neutral dusk gray, and the base is 5-slate gray. While the setiform hair in the same region has the apical zone * 3 blackish slate, the sub-apical is pinard yellow, and the base is 4 slate color.

The venter is completely white and well defined, but there is a brown band on the neck in most specimens.

The hair of the dorsal region of the tail is slate-black * 2, while its ventral portion is gray.

The dorsal portion of the legs is gray like the lateral portion of the body. However the ventral portion of the members varies: forelimbs are white, while the hindlimbs are brown. On the fingers there are long white hairs that cover the claws on all feet.

The most nasal vibrissae are completely Black. Nevertheless, a few vibrissae of the ventral region of the rostrum are white. The vibrissae around the eyes are completely black. There are short black hairs inside the ear.

The albino specimen is an adult (Fig. 1), age class 8, according to the description of the ontogeny of *Thrichomys pachyurus* (Neves & Pessôa, 2011). The greatest length of skull is 55.93 mm, and weight was 400 g for a living individual.

Most hairs on the dorsum – both aristiform and setiform – of the *Thrichomys pachyurus* albino specimen are completely white, but there are some small and sparse brown spots from the mid-dorsal region of the body to the median pelvic girdle. There is a conspicuous dark spot on the dorsum of the neck, between the ears. The aristiform hairs of this spot have a white apical zone, the sub-apical zone is black and the basal zone is white. Setiform hairs have black apical and basal zones, while the sub-apical zone is deep colonial buff and the base is white.

Just as the specimens of normal coloration, the albino specimen shows a completely white venter.

The hairs of the tail are completely white, with the exception of terminal hairs, which are brown mummy on the whole length. The feet are completely white.

The rostrum is completely white. Most nasal vibrissae are white. All vibrissae around the eyes are black. Most of the hair inside the ear is black, but some are white.

FIGURE 1: The specimen above is a *T. pachyurus* with normal coat color; the specimen below is a *T. pachyurus* with partial albinism (MN 63869).

DISCUSSION

This rare phenotypic variation in coat color of *Thrichomys pachyurus* represents an occurrence of partial albinism. There are melanocytes in hair follicles; however the synthesis of melanin does not occur. Melanocytes are the cells responsible for the production of melanin, and they are derived from melanoblasts. The moment of migration of melanoblasts from neural crest to epidermis in embryonic development determines the coloration patterns of a species (Wake, 1979). A delay in the migration time of melanoblasts would give rise to white spots and partial albinism (Stoddard, 1970), as is the case for analyzed specimen.

The anomalous pattern of coat color in the *Thrichomys pachyurus* analyzed is not random because it is directly linked to localization of the centers of origin and melanoblast migration (Stoddard, 1970; Wake, 1979). The most distant regions from centers – like tail, feet and rostrum – show deficiency of pigmentation. The centers of melanoblast migration, such as the head dorsal region, are more pigmented than others.

The specimen analyzed is the only albino in a sample of 18 specimens, and it is the only one deposited in the collection of mammals of the Museu Nacional, which has 4,000 specimens of genus *Thrichomys.* The rareness of conspicuously colored small mammals has been generally considered to be the result of the negative selection of coat color by predators (Kaufman & Wagner, 1973; Kaufman, 1974).

The large size of the albino specimen, whose skull is larger than the average species (55.43 ± 2.06 mm), and whose weight approaches the highest recorded for *Thrichomys pachyurus* (700 g) (Pessôa *et al., in press*), is explained as a natural protection of the environment. Peles *et al.* (1995) showed that predators do not prey more conspicuously on colored small rodents than on mammals with normal coloration in grassland habitats of high quality nutritional and heavy vegetative cover. The geographical distribution of *Thrichomys* is associated with the belt of open vegetation in South America (Alho, 1982; Mares & Ojeda, 1982, Pessôa *et al., in press*). Corumbá, in the Pantanal biome, presents grassland habitats that offer protection to predators.

RESUMO

Registros de albinismo em roedores são comuns. Na família Echimyidae, no entanto, albinismo é muito raro. Este é o segundo caso de variação da cor da pelagem registrado para Echimyidae e o primeiro para o gênero Thrichomys. *A pelagem de indivíduos de* Thrichomys pachyurus *com a cor normal e a variante foram observados sob luz fluorescente artificial e foram examinados com um microscópio estereoscópico. As descrições da cor da pelagem foram baseados no livro "Color Standards and Color Nomenclature". O padrão predominantemente branco da cor da pelagem no indivíduo de* T. pachyurus *sugere um abinismo parcial causado pelo atraso no tempo de migração dos melanoblastos da crista neural para a epiderme. O habitat de* T. pachyurus *tem uma densa cobertura vegetal, que oferece proteção natural contra predadores e nutrição de alta qualidade.*

Palavras-Chave: Albino; *Thrichomys pachyurus;* Neotropical; Pantanal; Cor da pelagem.

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