

**Taxidermy applied to the first documented case of an albino marmoset
(*Callithrix* sp.) in nature in the State of São Paulo, Brazil - Strategies
for environmental awareness and education**

**Taxidermia aplicada ao primeiro caso documentado de um sagui
albino (*Callithrix* sp.) na natureza no Estado de São Paulo, Brasil-
Estratégias para sensibilização e educação ambiental**

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ABSTRACT

Brazilian mastofauna exhibits high diversity, including a significant presence of primates of the genus *Callithrix*, a group in which reports of color variations, such as albinism, are rare. In this context, taxidermy stands out as an important tool for conservation, morphological study, and support for environmental education, especially through biological collections. The objective of this study was to present taxidermy as a tool applied to the study and conservation of wild animals, as well as to describe the preparation process of the first specimen of an albino marmoset of the genus *Callithrix* sp. recorded in the wild, intended for the scientific collection of the IBIMM Institute. The carcass of the albino marmoset was used to perform the taxidermy process. The procedure involved a ventral incision, removal of the integument, tissue removal, cleaning, tanning with borax, mounting on a wire frame, filling with hydrophobic cotton, suturing, insertion of artificial eyes, and mounting on a plant support, followed by drying and chemical preservation. The procedure allowed for the preservation of the specimen's morphological characteristics, including phenotypic aspects of albinism, such as depigmentation and reddish eyes. The material was properly prepared, stabilized, and finished, resulting in a specimen with structural integrity and scientific value, in addition to the collection of biological samples for complementary analyses. Taxidermy proved effective in the conservation and preparation of rare specimens, contributing to scientific research, teaching, and environmental

education. The specimen was incorporated into the IBIMM collection, reinforcing the importance of biological collections as fundamental tools for the understanding and preservation of biodiversity.

Keywords: albino marmoset, taxidermy, primate, conservation, albinism, environmental education

RESUMO

A mastofauna brasileira apresenta elevada diversidade, incluindo grande representatividade de primatas do gênero *Callithrix*, grupo no qual o registro de alterações de coloração, como o albinismo, são raros. Nesse contexto, a taxidermia destaca-se como uma importante ferramenta para conservação, estudo morfológico e apoio à educação ambiental, especialmente por meio de coleções biológicas. O presente estudo teve como objetivo apresentar a taxidermia como ferramenta aplicada ao estudo e conservação de animais silvestres, bem como descrever o processo de preparação do primeiro exemplar de sagui albino do gênero *Callithrix* sp. registrado na natureza, destinado ao acervo científico do Instituto IBIMM. Foi utilizada a carcaça do sagui albino para realizar o processo taxidérmico. Procedeu-se com incisão ventral, descolamento tegumentar, remoção de tecidos, limpeza, curtimento com bórax, montagem com armação de arames, preenchimento com algodão hidrofóbico, sutura, inserção de próteses oculares e fixação em suporte vegetal, seguido de secagem e conservação química. O procedimento permitiu a preservação das características morfológicas do exemplar, incluindo aspectos fenotípicos do albinismo, como despigmentação e olhos avermelhados. O material foi adequadamente preparado, estabilizado e finalizado, resultando em um espécime com integridade estrutural e valor científico, além da coleta de amostras biológicas para análises complementares. A taxidermia mostrou-se eficaz na conservação e preparação de espécimes raros, contribuindo para pesquisas científicas, ensino e educação ambiental. O exemplar foi incorporado ao acervo do IBIMM, reforçando a importância das coleções biológicas como ferramentas fundamentais para o conhecimento e preservação da biodiversidade.

Palavras-chave: sagui albino, taxidermia, primata, conservação, albinismo, educação ambiental

RESUMEN

La fauna mamífera brasileña presenta una gran diversidad, que incluye una amplia representación de primates del género *Callithrix*, grupo en el que los casos de alteraciones en la coloración, como el albinismo, son poco frecuentes. En este contexto, la taxidermia destaca como una herramienta importante para la conservación, el estudio morfológico y el apoyo a la educación ambiental, especialmente a través de colecciones biológicas. El presente estudio tuvo como objetivo presentar la taxidermia como herramienta aplicada al estudio y la conservación de animales silvestres, así como describir el proceso de preparación del primer ejemplar de tití albino del género *Callithrix* sp. registrado en la naturaleza, destinado a la colección científica del Instituto IBIMM. Se utilizó el cadáver del tití albino para llevar a cabo el proceso taxidérmico. Se procedió a realizar una incisión ventral, el desprendimiento de la piel, la extirpación de tejidos, la limpieza, el curtido con bórax, el montaje con armazón de alambre, el relleno con algodón hidrófobo, la sutura, la inserción de prótesis oculares y la fijación en soporte vegetal, seguido del secado y la conservación química. El procedimiento permitió la preservación de las características

morfológicas del ejemplar, incluyendo aspectos fenotípicos del albinismo, como la despigmentación y los ojos enrojecidos. El material fue adecuadamente preparado, estabilizado y acabado, dando como resultado un espécimen con integridad estructural y valor científico, además de la recogida de muestras biológicas para análisis complementarios. La taxidermia demostró su eficacia en la conservación y preparación de especímenes raros, contribuyendo a la investigación científica, la enseñanza y la educación ambiental. El ejemplar se incorporó al fondo del IBIMM, reforzando la importancia de las colecciones biológicas como herramientas fundamentales para el conocimiento y la preservación de la biodiversidad.

Palabras clave: tarsero albino, taxidermia, primate, conservación, albinismo, educación ambiental

1 INTRODUCTION

Brazil's mammal fauna is highly diverse, with more than 700 species already recorded, accounting for over 10% of the world's known mammal species (Paglia et al. 2012). A large proportion of these species are arboreal. In the case of primates, Brazil stands out for hosting the greatest global diversity, with about 133 species, approximately 57% of which are endemic (Brito, 2007; Paglia et al. 2012).

Marmosets belong to the genus *Callithrix* and include six species endemic to Brazil: *Callithrix aurita*, *C. flaviceps*, *C. geoffroyi*, *C. jacchus*, *C. kuhlii*, and *C. penicillata* (Rubiao et al. 2026).

According to (Rubiao et al. 2026), *Callithrix* spp. refers to the genus of small Neotropical primates (marmosets) endemic to Brazil, particularly the Atlantic Forest, Cerrado, and Caatinga. They measure between 18–27 cm, weigh 300–400 g, and feed on sap, fruits, and insects. Common species include *C. jacchus* (white tufted marmoset) and *C. penicillata* (black tufted marmoset), with many populations threatened by habitat loss and hybridization.

In the genus *Callithrix*, there are reports of anomalous coloration phenotypes caused by leucism (partial absence of pigment, but with normally pigmented eyes), especially in *C. jacchus* and *C. penicillata*, documented in fragmented forests and urban areas in Brazil (Aximoff, et al. 2020; Leandro-Silva, et al. 2023; Vale, et al., 2018). However, to date, there has been no confirmed report of true albinism in individuals of *Callithrix* sp. The confirmation of a case of genuine albinism in these primates will contribute to the understanding of the genetic evolution of pigmentation and the ecological effects of hypopigmentation in Neotropical primates (Rubiao, et al. 2026).

In Brazil, Environmental Education, as established by Law No. 9,795/1999, is characterized as a continuous process aimed at building values, knowledge, and attitudes directed toward environmental conservation. It is an integrative approach that is not restricted to a specific discipline and should be present at different levels of education and in social practices. Furthermore, it involves political, philosophical, and pedagogical dimensions, fostering connections between fields of knowledge and promoting the development of critical awareness regarding socio-environmental issues (Athayde et al. 2025).

The act of collecting has accompanied humanity since its earliest times, being a practice intrinsically linked to cultural, social, and emotional aspects, as well as reflecting structures of power and social organization (Lopes, 2010; Carlan, 2008). When these collections come to involve conservation, exhibition, and educational activities, they are recognized as museums, also assuming the role of publicly legitimizing the collections and ensuring their preservation and visibility over time (Suano, 1986; Oliveira, 2017).

Biological collections consist of organized sets of properly preserved biological materials intended for scientific, educational, and conservation purposes (MMA, 2007; Bezerra, 2012; Pimenta et al., 2017; SIBBr, 2017). They possess high educational and scientific value and may, in certain situations, constitute the only record of rare or already extinct species, in addition to providing fundamental information on biological diversity and its distribution (Marinoni; Peixoto, 2010; PPBio, 2018).

The relevance of these collections spans various fields, such as economics, agriculture, public health, and environmental monitoring, aiding both research and the formulation of public policies. They are also essential for studies on environmental changes, pest control, and the analysis of epidemiological outbreaks (SPNHC, 2018). In this sense, they constitute an indispensable infrastructure for scientific and technological development, contributing to the understanding of biodiversity over time and to the projection of future scenarios, including those related to climate change (Kury et al. 2006; Canhos et al. 2006).

In the educational context, taxidermy stands out as an important teaching resource, as it allows for direct observation of animals' morphological characteristics, making learning more concrete and interactive. Thus, it brings students closer to species that they would otherwise only encounter through images or observation in their natural habitats (Rocha, 2010; Costa et al., 2014). Furthermore, it contributes to environmental awareness by highlighting biological diversity and can be used as an inclusive tool in science education, especially for people with visual impairments (Arantes; Dias, 2013).

Thus, taxidermy consists of a technique that involves removing the animal's skin after its death, followed by treatment and mounting on an artificial structure, with the aim of reproducing its original form (Auricchio; Salomão, 2002). Methods vary depending on the type and size of the animal, with open-skin and closed-skin techniques being common; the latter is widely used because it helps preserve anatomical features. With technological advances, traditional materials, such as straw, have been replaced by more durable options, such as sawdust, paraffin, and synthetic materials (Rocha, 2010).

Museums and science centers play an essential role in non-formal education, offering greater flexibility in the approach to content and methodologies. These spaces foster interdisciplinary and contextualized practices, while also strengthening scientific and humanistic culture (Vasconcelos, 2005). From this perspective, museum education must go beyond the simple transmission of information, moving beyond the traditional teaching model and promoting the active participation of individuals in the construction of knowledge (Freire, 1994).

According to Moreira and colleagues (2014), the use of taxidermized animals as a teaching resource has proven effective in sparking students' interest in acquiring new knowledge, especially regarding the behavior and characteristics of fauna.

Given the use of taxidermy across various disciplines such as anatomy, biogeography, ecology, evolution, physiology, and conservation biology, its extreme importance is evident not only for undergraduate students and researchers but also for the general public, who can learn about environmental education, the importance of complying with environmental legislation, and how human actions can affect animal life. Furthermore, on a global scale, taxidermy represents the planet's environmental wealth, as this technique conserves and preserves dead specimens from the most diverse regions and countries, as well as animals that are no longer found in the wild today (Himpel, et al. 2023).

This article aims to present taxidermy and its application as a tool for the study and conservation of wild animal species. Furthermore, it seeks to describe the entire taxidermy process of the first specimen of an albino marmoset of the genus *Callithrix* sp. recorded in the wild, as well as its preparation for inclusion in the Natural History collection of the Institute of Marine Biology and Environment (IBIMM).

2 MATERIALS AND METHODS

In this study, we used the carcass of a wild non-human primate (NHP), an albino marmoset of the genus *Callithrix* sp., housed in the biological collection of the IBIMM

Institute, located at the Research Center of the Institute of Marine Biology and Environment (IBIMM). The specimen was transferred to the institution's laboratories for the purpose of supporting future projects, research, and studies. The project involving the use of animal carcasses was submitted to the CEUA/IBIMM (Ethics Committee on Animal Use) at a meeting held on February 12, 2026, and was approved under license no. 025/2026.

The animal referred to in this article was collected while still alive in the city of Casa Branca, São Paulo, by the local civil defense team and transported to the city of Santa Cruz das Palmeiras, São Paulo, a neighboring municipality, for care at a veterinary clinic with a professional specializing in wild animals. However, after a few hours, despite all the care provided, the animal died and was then sent to IBIMM for study purposes. The institution has a research center located at Fazenda Palmares, in the same municipality, where the specimen was duly registered, documented, and stored in a freezer until taxidermy was performed.

To perform clinical and imaging examinations, such as radiography and ultrasonography, as well as to begin the taxidermy process, the animal was first removed from the freezer and allowed to thaw naturally for approximately 24 hours. This procedure enabled the investigation of the cause of death and complied with current health regulations.

The animal's biometrics were recorded as recommended by Rubião (2026), with the aim of establishing the specimen's measurements and supporting the creation of body molds and the subsequent stuffing of the skin. For this purpose, technical forms were used to create labels, on which the following data were recorded: common name, scientific name, sex, body and tail measurements (obtained at the time of stuffing), as well as the collection site and photographic records of the specimen's characteristics.

Thus, the taxidermy procedure began, in which the *Callithrix* sp. specimen was positioned on a surgical table in the supine position to adequately expose the ventral region. A ventral midline incision was then made using a surgical scalpel fitted with a No. 20 blade, approximately 8 cm in length, starting in the presternal region and extending to the mesogastrium. Following the incision, the skin was dissected through careful separation, allowing the skin in the abdominal region to be retracted.

The skin stripping procedure continued with the skin being retracted toward the cranial region, up to the level of the labial sulci. The skull was disarticulated at the atlanto-occipital joint (C1), and the adjacent musculature was removed while preserving the

tongue. Next, the cranial cavity was opened to remove the brain, from which samples were collected for clinical analysis and subsequent submission to public health authorities. The eyeballs were removed using a delicate technique to preserve their structural integrity, placed in an appropriate container, and kept frozen for future studies. Additionally, skin samples with hair and tissue fragments were collected for genetic and DNA analysis.

On the thoracic and pelvic limbs, the skin was peeled back to the level of the phalanges, preserving the integrity of the digits. Subsequently, these structures underwent specific chemical treatment for skin preservation. The tail was removed entirely by controlled traction, without the need for additional incisions, while maintaining its attachment to the skin at the basal region.

The obtained skin was cleaned under running water using a mild detergent to remove organic residues, such as blood and secretions. It was then dried using a heat gun set to an average temperature of approximately 60 °C.

To construct the internal support (frame), galvanized wires (1.5 mm) were arranged in a cross pattern: one connecting the right thoracic limb to the left pelvic limb and another connecting the left thoracic limb to the right pelvic limb, both crossing the palmar and plantar regions. Additionally, a third longitudinal wire was inserted, extending from the skull to the tail. All wires were properly secured to one another, ensuring structural support for the specimen.

The skull was treated with sodium tetraborate (borax), and its cavities were subsequently filled with biscuit-type modeling clay. The end of the axial wire was inserted into the cranial cavity through the foramen magnum, and its tip was shaped into a hook for better fixation. The eye sockets were also filled with the same modeling compound, and the natural eyes were replaced with reddish-colored spherical plastic prostheses to achieve greater morphological fidelity.

For body modeling, the skin was again treated with sodium tetraborate and filled with hydrophobic cotton, allowing for the volumetric reconstruction of the body, limbs, and tail. After filling, the incision was closed using continuous suturing with transparent nylon thread (0.5 mm) and a straight intradermal injection needle.

The specimen was positioned anatomically on a plant support (twig), and injections of a 4% formaldehyde solution (prepared from commercial 37% formalin) were administered throughout the body, with a higher concentration in regions containing bone and muscle remnants, such as the skull, phalanges, and tongue.

Finally, the specimen was kept in a shaded, dry environment, protected from excessive moisture, for the drying and stabilization process on the support.

Over a period of seven days, weekly applications of formaldehyde were made to the soft tissues to improve preservation.

Additionally, an anti-termite agent solution was administered via injection to prevent infestation by insects and other xylophagous agents.

3 RESULTS

Photographic identification of the animal was performed, as illustrated in Figure 1A, with the specimen positioned in the supine position. Next, a photographic record of the face was taken to highlight the phenotypic characteristics of albinism, such as marked facial depigmentation, reddish eyes, and the whitening of the thoracic limbs and coat (Figure 1B). Subsequently, the animal was positioned in a cranial lateral view, allowing for the collection of measurements and identification using the IBIMM Institute Museum's markings (Figure 1C). Finally, biometric measurements were taken, and the specimen was marked and identified (Figure 1D).

Figure 1 – In A: carcass of an albino marmoset (*Callithrix* sp.) in a supine position; in B: image showing facial and color characteristics associated with albinism in the species; in C: biometric measurements of the albino marmoset; in D: identification photo of the animal for inclusion in the IBIMM Institute's biology collection. Source: Prepared by the authors (2026).



The incision procedure to remove the animal's body was performed via a longitudinal incision in the ventral region, extending across the abdominal and thoracic regions, as illustrated in Figure 2E. The purpose of this step was to detach and separate the skin from the underlying tissues, allowing for subsequent cleaning and the removal of excess adipose tissue. Following the dissection of the tissues, the skin was separated from the body using a scalpel, ensuring greater precision during the procedure (Figure 2F).

Figure 2 – In E: marmoset with a longitudinal incision in the ventral region, extending across the abdomen and thorax; in F: procedure for separating the skin from the body using a scalpel. Source: Prepared by the authors (2026).



After opening and detaching the skin in the abdominal region, the thoracic and pelvic limbs were disarticulated using a surgical scalpel fitted with a No. 20 blade, and skull measurements were obtained, as illustrated in Figure 3. The skin on the limbs was carefully separated, keeping the distal phalanges intact (Figure 3G). Subsequently, the skull was measured, with the skin properly folded back and secured to its structure (Figure 3H).

Figure 3 – In G: separation of the skin from the limbs, with the distal phalanges intact; in H: measurement of the skull and skin folded back and secured to the skull. Source: Prepared by the authors (2026).



After complete separation and cleaning of the skull, it was properly prepared and stabilized for the subsequent insertion of ocular prostheses and fixation of the body. The body is shown with the skin folded back and secured to the cranial structure (Figure 4I), as well as the cephalic region showing the dental arch, now without the eyeballs (Figure 4J).

Figure 4 – In I: exposed body with the skin folded back and secured to the skull; in J: marmoset head showing the dental arch, without eyeballs. Source: Prepared by the authors (2026).



The skin cleaning procedures consisted of successive rinses under running water, combined with the application of a mild detergent, aimed at removing dirt and excess adipose tissue, as illustrated in Figure 5.

Figure 5 – In K and L: skin removed from the body, detached, and washed. Source: Prepared by the authors (2026).

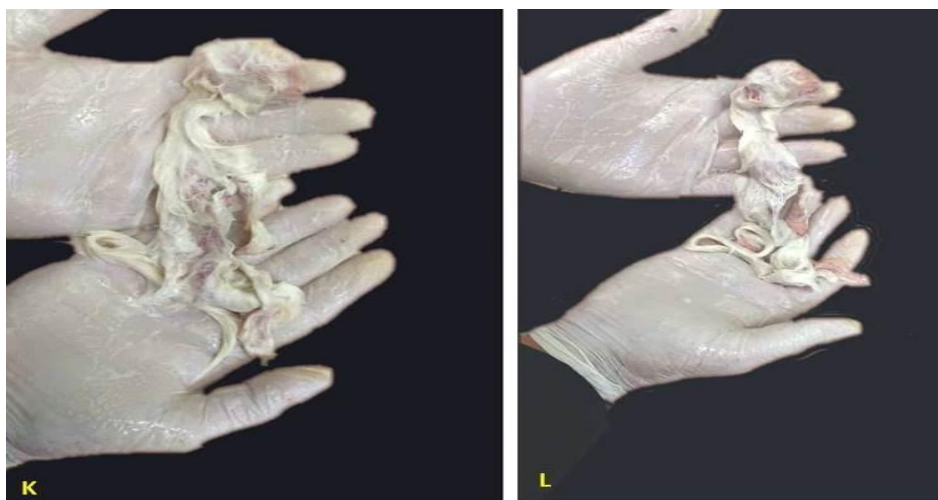
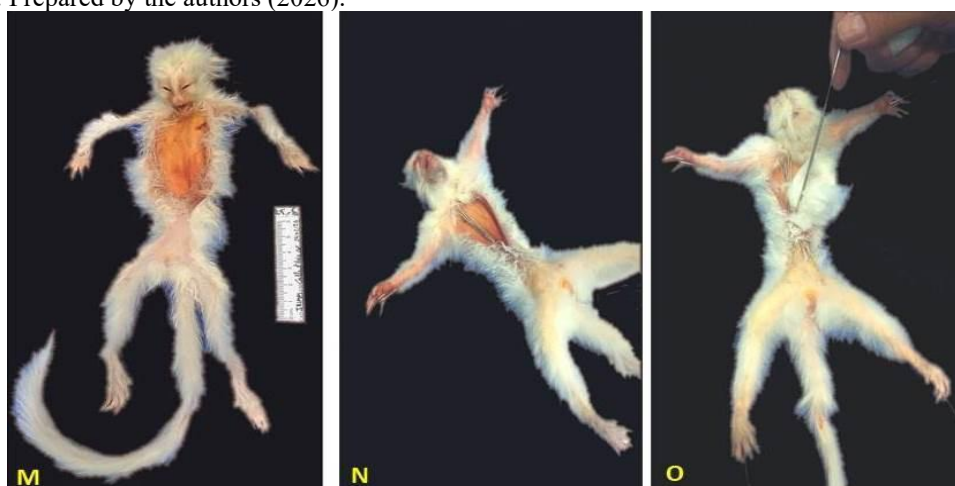
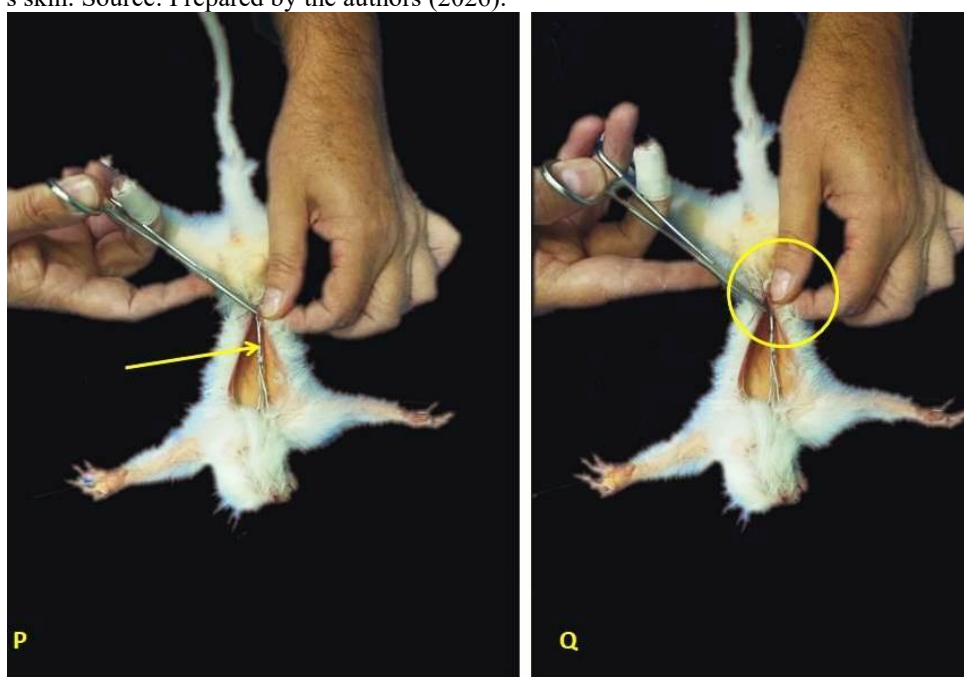


Figure 6 – M: dried animal; N: wires threaded through the trunk; O: wires threaded through the limbs.
Source: Prepared by the authors (2026).



During the skin suturing and wire fixation stage, after assembling the support structure and filling it with hydrophobic cotton, the skin closure procedure began. For this purpose, straight mosquito hemostatic forceps, a surgical needle, and 0.5 mm transparent suture thread were used, ensuring adequate approximation of the incision edges and stabilization of the assembly (Figures 7P and 7Q).

Figure 7 – In P (arrow): position of the wire supporting the body mold (mannequin); and in Q (circle): suture site using straight mosquito hemostatic forceps, a needle, and 0.5 mm suture thread for closing the animal's skin. Source: Prepared by the authors (2026).



The final step consisted of preparing and inserting reddish-colored artificial eye prostheses, positioned to reproduce the specimen's natural characteristics. Next, the animal was properly oriented for mounting on a plant support (trunk) for display, as illustrated in Figures 8R and 8S.

Figure 8 – In R and S: animal with the body stuffed (mannequin), reddish artificial eyes, positioned for mounting on a log. Source: Prepared by the authors (2026).



Finally, the taxidermied specimen was positioned and properly secured to a wooden support, ready for the drying process and subsequent display, as illustrated in Figures 9T and 9U.

Figure 9 – T and U: positioning test on branches of different sizes and the finished specimen in position for drying. Source: Prepared by the authors (2026).



4 CONCLUSION

Taxidermy has proven to be an effective technique for the conservation of wild specimens, contributing to the preservation of morphological characteristics essential to scientific study and supporting educational and environmental education activities. This study provided a detailed description of all stages of the taxidermy process, from collection to preparation, mounting, and finishing of the specimen, ensuring quality and fidelity to the animal's original characteristics through the adoption of appropriate technical procedures.

The use of a specimen of *Callithrix* sp. with albinism stands out due to the rarity of such records in the literature, enhancing its scientific and educational value, as well as enabling complementary analyses, such as genetic and clinical studies. Finally, the specimen was incorporated into the IBIMM Institute's collection, becoming part of a biological collection relevant for teaching, research, and outreach, reinforcing the importance of taxidermy as a multidisciplinary tool in the conservation and dissemination of scientific knowledge.

Taxidermy is an important tool for the conservation of significant findings from dead animal specimens and represents a significant way to pass on techniques for preserving animals to future generations. The barriers are significant, and today there are few courses or even training opportunities for students and professionals in the fields of biology and veterinary medicine. Undergraduate programs and university administrations should place greater emphasis on training students in the art of taxidermy, thereby producing a larger number of professionals in this magnificent field of conservation.

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