

Geo-Sciences

The Museu de Paleontologia Plácido Cidade Nuvens and the scientific tourism potential in the Cariri region, northeastern Brazil

O Museu de Paleontologia Plácido Cidade Nuvens e o potencial do turismo científico na região do Cariri, nordeste do Brasil

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ABSTRACT

This study investigates the role of the Plácido Cidade Nuvens Paleontology Museum (MPPCN) in promoting scientific tourism and socioeconomic development in Santana do Cariri, Ceará, Brazil. The research focuses on the institution's contributions to fossil heritage preservation and regional scientific-cultural valorization. Through qualitative analysis and academic literature review, the study evaluates the museum's capacity to attract researchers, students, and tourists, establishing the region as an international paleontological reference. The investigation examines the relationship between museum initiatives and community engagement, particularly through outreach programs that connect scientific heritage with local populations. Notable projects such as the Expanded Museum Program demonstrate how educational activities have been extended to underserved communities. Furthermore, the analysis reveals how the intersection of scientific and religious tourism has contributed to local economic growth while creating educational opportunities and strengthening community participation in heritage conservation.

Keywords: Scientific tourism; Paleontology; Araripe Basin

RESUMO

O objetivo deste estudo foi analisar o impacto do Museu de Paleontologia Plácido Cidade Nuvens (MPPCN) no desenvolvimento do turismo científico e socioeconômico em Santana do Cariri, Ceará. Esta pesquisa aborda o papel central do MPPCN na preservação do patrimônio fossilífero e sua contribuição para a valorização cultural e científica da região. A pesquisa qualitativa e descritiva, com revisão de fontes acadêmicas, discute o potencial do turismo científico na região. A análise destaca como o museu tem atraído pesquisadores, estudantes e turistas ao longo dos anos, consolidando a cidade como um

centro internacional de paleontologia. O estudo explora a relação entre o museu e a comunidade local, destacando projetos que visam aproximar a população de seu patrimônio científico e cultural. A relação do museu com a comunidade ocorre por meio de iniciativas que integram pesquisa, educação e turismo, como por exemplo, o Projeto Museu Ampliado que promoveu atividades em áreas carentes. O turismo religioso tem se consolidado como um vetor de desenvolvimento local, aliado ao científico criando novas oportunidades econômicas e educacionais, além de fomentar o engajamento comunitário.

Palavras-chave: Turismo científico; Paleontologia; Bacia do Araripe

1 INTRODUCTION

Museums play an important role in the preservation and protection of memories, either by strengthening the cultural ties that characterize social groups or by disseminating knowledge and culture (IBRAM, 2016).

According to the definition by the Brazilian Statute of Museums, Law No. 11.904/2009, in Article 1, in Brazil, museums are nonprofit institutions that aim to conserve, research, communicate, interpret, and exhibit sets and collections of historical value; artistic, scientific, and technical value; or any other cultural nature for the purposes of preservation, study, research, education, appreciation, and tourism. They are open to the public, serving society and its development (BRASIL, 2009).

Considering this concept, the Museu de Paleontologia Plácido Cidade Nuvens (MPPCN), formerly known as the Museu de Paleontologia de Santana do Cariri (MPSC), of the Universidade Regional do Cariri (URCA), plays a key role in the science and culture of the region of Cariri, Ceará. This nonprofit institution is dedicated to the conservation, research, and exhibition of a fossiliferous collection of global relevance and the promotion of regional tourism.

According to Anjos and Andrade (2021), tourism represents a pivotal sector of the global economy, significantly contributing to job creation and fostering socioeconomic development at both local and regional scales.

Tourism can be characterized as a social phenomenon that brings together individuals from different cultures and beliefs in search of new experiences and

appreciation. This activity not only enriches the cultural experiences of tourists but also plays a significant role in stimulating the local economy and improving the surrounding infrastructure (Almeda; Enoque; Júnior, 2019).

In Brazil, tourism is conceptualized through a framework that divides it into 12 distinct categories, each catering to different interests and experiences. These include: (i) adventure tourism, which focuses on challenging outdoor activities; (ii) sun and beach tourism, centered around leisure in coastal destinations; (iii) cultural tourism, which emphasizes the exploration of historical and artistic heritage; (iv) ecotourism, which prioritizes sustainability and environmental conservation; (v) nautical tourism, dedicated to water-based activities; (vi) business and event tourism, supporting the corporate sector, conventions, and trade shows; (vii) rural tourism, which offers immersive experiences in rural settings; (viii) social tourism, aimed at democratizing access for vulnerable groups; (ix) fishing tourism; (x) health tourism; (xi) sports tourism; and (xii) educational exchange and religious tourism. This segmentation provides a structured approach to tourism development in Brazil, reflecting the country's diverse attractions and interests (MTUR, 2013).

Scientific tourism, defined as the activity in which visitors observe and collect data and information for scientific purposes during their travel experiences (MARGONI, 2015), is not formally categorized in Brazil. Although recognized in academic contexts, this segment is generally included under broader categories such as ecotourism or educational tourism, without a specific legal or institutional definition.

Scientific Tourism is an activity focused on the production of scientific knowledge, covering various areas of study (Conti et al., 2021). It involves researchers, students, and amateurs who seek to deepen their understanding by exploring historical, natural, and urban landscapes through activities such as laboratory immersion, field trips, studies, and exchanges (Queiroz, 2020).

This expanding sector has the potential to foster job creation and income generation for local communities while also providing support for scientific research

initiatives. Scientific tourism involves travel motivated by the pursuit of knowledge in areas such as biology, paleontology, and geology, such that participants can engage in research activities and visit scientific institutions, museums, and natural parks. This modality promotes education, environmental awareness, and appreciation of scientific heritage, strengthening the interaction between the general public and the scientific community (Conti; Elicher; Lavandoski, 2021).

Morse (1997) noted that scientific tourism originated in the late 19th century, when scientific disciplines, which were dependent on field expeditions, began the systematic exploration of the world in search of knowledge.

However, these scientific expeditions for the pursuit of knowledge already existed in the 18th century. In 1800, the naturalist João da Silva Feijó (1760-1824) made an important contribution to Brazilian paleontology by describing fossils found in the Captaincy of Ceará, particularly in the region that today corresponds to the Araripe Basin (Fernandes, 2020).

Feijó arrived in Ceará in October 1799 with the objective of fulfilling the mission assigned in the provision of February 25 of the same year, signed by Queen Maria I of Portugal (1734-1816), which mandated the study of all the natural potentialities of the region (Silva; Lopes, 2004), (figure 1).

Feijó was a pioneer in documenting explorations focused on natural history in the Cariri region, where he observed concretions containing fossilized fish, which he referred to as “petrifications”. These fossil finds represented one of the first scientific records of the paleontological richness of the region and were found in the Araripe Basin. Their descriptions included fossils of fish and other organisms, highlighting the exceptional preservation of the samples, which would become internationally recognized as belonging to the Cretaceous (Oliveira, 2014; Saraiva et al., 2021).

This study marked the beginning of the recognition of the Araripe Basin as one of the main fossiliferous deposits in Brazil and the world. Although there are no known images of João da Silva Feijó, his relevance to Brazilian science is undeniable, as

evidenced by his detailed written accounts in letters, which provided valuable records of his observations and research (figure 1).

Figure 1 – Signature on the letters of João da Silva Feijó and portrait of Queen Maria I



Source: Modified from ROQUE and TORRÃO (2013) and Google Arts – National Coach Museum

Caption: Signature of João da Silva Feijó, a naturalist responsible for studying the natural potentialities of Ceará in the late 18th century, and a portrait of Queen Maria I of Portugal (1734-1816), who assigned him to the mission

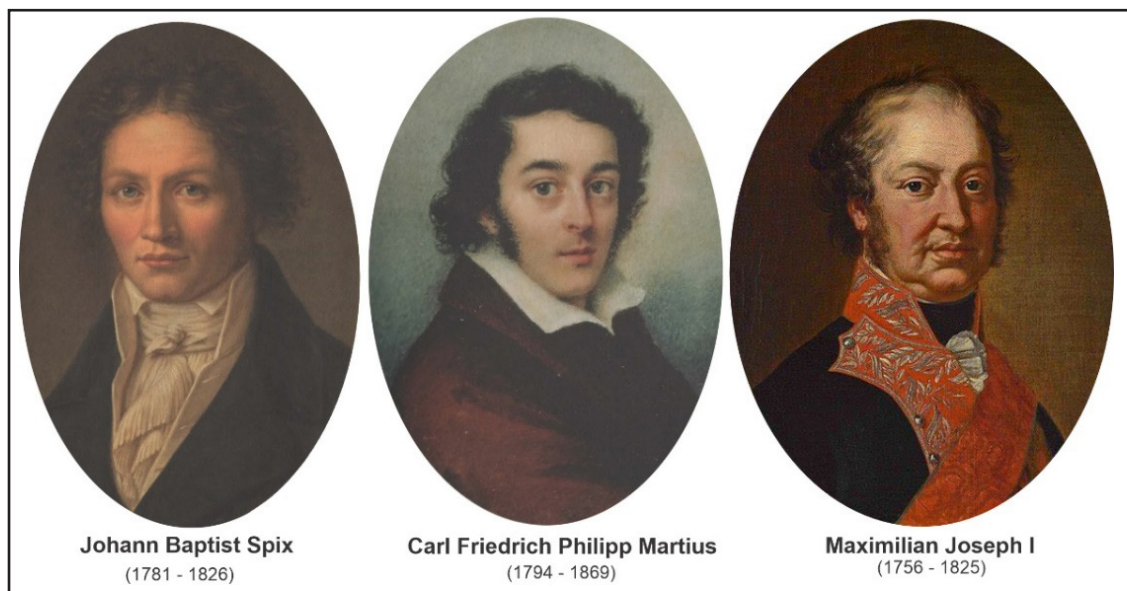
The contribution of João da Silva Feijó encouraged future expeditions and detailed studies on the paleontology of Ceará, establishing the area as a reference in Brazilian science.

The scientific search for knowledge about Ceará fossils continued after the pioneering contributions of João da Silva Feijó in the early nineteenth century. Between 1817 and 1823, the German naturalists von Spix and von Martius visited Fortaleza, the then-capital of Ceará Province, and participated in the collection of fossils in the region and their transport to the Munich Museum in Bavaria (figure 2). This collection was described in a report sent to King Maximilian Joseph I (figure 2), documenting the paleontological richness of the Araripe Basin and expanding

the international recognition of the Cariri region as a valuable fossiliferous deposit (Maisey, 1991; Spix; Von Martius, 1831).

This process of fossil collection and scientific documentation, however, was embedded within the broader colonial framework, where scientific production was predominantly controlled by European men and often functioned as a tool of domination. By imposing knowledge hierarchies, colonial science extracted and transferred natural heritage from colonized regions to European institutions, reinforcing asymmetries in the production and circulation of scientific knowledge.

Figure 2 – The Pioneer Naturalists in the Study of the Region



Source: Modified from Costa and Diener (2018). Caption: The German naturalists von Spix and von Martius and King Maximilian Joseph I

Currently, the Araripe region maintains its position as an important center of interest for researchers and tourists and is recognized internationally for its significant paleontological relevance and positive impact on scientific and cultural development in Brazil. Abundant preserved fossils can be found in the main region.

The role of museums in preserving memory and disseminating knowledge is well established, particularly in strengthening cultural ties and promoting tourism. Despite its relevance to socioeconomic development and the valorization of natural

and cultural heritage, scientific tourism in Brazil lacks formal categorization. This gap complicates regulation and the implementation of public policies that support its expansion.

Alongside scientific tourism, religious tourism drives regional development, diversifying tourism activities and contributing to economic growth. Pilgrimage events attract thousands of visitors annually, generating significant socioeconomic impacts, while scientific tourism, particularly in paleontology, promotes the fossil heritage of the Araripe Basin.

This study examines the significance of scientific tourism in the region, focusing on the role of the Plácido Cidade Nuvens Museum of Paleontology (MPPCN) in its promotion. It also assesses how paleontology fosters science-society interaction, supports local economic development, and contributes to fossil heritage preservation. In the municipality of Santana do Cariri, the interplay between scientific and religious tourism underscores the complexity and potential of tourism in Cariri, highlighting the need for integrated strategies to ensure sustainability and growth.

2 METHODOLOGY

In this study, a qualitative and descriptive approach was used to examine the impact of the MPPCN on the scientific tourism and regional development of Santana do Cariri. The adopted methodology includes a comprehensive literature review, which is based on academic sources, scientific journal articles, and institutional publications on scientific tourism, the paleontology of the Araripe Basin, and the role of museums in promoting science and culture.

The research, conducted between December 2024 and March 2025, utilized highly relevant academic platforms, such as Google Scholar, SciELO, and ResearchGate. A total of 38 references were identified, of which all were analyzed based on their relevance to the study, using the keywords “scientific tourism,” “regional development,”

“paleontological heritage,” “Araripe Basin,” “Museu de Paleontologia Plácido Cidade Nuvens,” “Museu de Paleontologia de Santana do Cariri”, “science museums,” “cultural appreciation,” and “regional paleontology.”

3 RESULTS AND DISCUSSION

3.1. Santana do Cariri Municipality and Tourism in the Region

Located in southern Ceará, the territory of Araripe Geopark spans over 5,000 km², encompassing the municipalities of Barbalha, Crato, Juazeiro do Norte, Missão Velha, Nova Olinda, and Santana do Cariri. Established through an initiative of the Ceará State Government and coordinated by the Regional University of Cariri (URCA), the Araripe Geopark was recognized by UNESCO in 2006 as the first Geopark in the Americas, originally consisting of nine geosites (Siebra; Bezerra; Oliveira, 2011).

The Araripe Geopark currently encompasses 11 geosites of regional, national, and international significance, which highlight the area’s rich paleontological, archaeological, and natural heritage. These geosites include Colina do Horto (Juazeiro do Norte), Cachoeira de Missão Velha, Petrified Forest (Missão Velha), Batateiras (Crato), Pedra Cariri and Ponte de Pedra (Nova Olinda), Pterosaur Park and Pontal da Santa Cruz (Santana do Cariri), and Riacho do Meio, Mirante do Caldas, and Arajara (Barbalha) (Souza; Neta, 2024).

However, it is in the municipality of Santana do Cariri that the abundance of fossils stands out, making it an area of significant paleontological importance.

Santana do Cariri, located in the Cariri region of southern Ceará, Northeast Brazil, has a population of 16,954 and covers an area of 807 km², according to the 2022 census by the Brazilian Institute of Geography and Statistics (IBGE). Despite its relatively small population, the municipality stands out as an important hub for research and tourism, gaining international recognition for its paleontological significance.

This recognition is largely attributed to the pivotal role played by the MPPCN and the Geopark Araripe, which serve as key references in the study and preservation of fossils in the region (Saraiva et al., 2021).

As a result of these factors, the Ceará state government officialized Santana do Cariri as the “Cearense Capital of Paleontology” on September 27, 2005. The designation was sanctioned by the then-Governor Lúcio Gonçalo de Alcântara (PSDB) in Law No. 13.674 (Project of Law No. 102/05, authored by Deputy Gislaine Landim (PSB), with the municipality being recognized as a relevant paleontological center in the regional and national context (Oliveira; Chacon, 2009).

This dynamic underscores the significance of initiatives aimed at fostering engagement between the local population and the museum, enhancing their understanding of its regional importance, and bolstering scientific and cultural tourism.

In this sense, the Expanded Museum Project, which was conducted at MPPCN, was implemented with the objective of making paleontology more accessible and didactic for local communities, which historically had limited interaction with the museum. The goal of this project was to increase scientific interest among the people of Santana do Cariri through interactive activities, workshops, and guided tours, bringing the local population closer to the rich paleontological heritage of the region (Pinheiro et al., 2021).

According to Pinheiro et al. (2021), the Expanded Museum Project aimed to promote paleontology and environmental education in the communities of Santana do Cariri, expanding the museum’s outreach within the Araripe Geopark territory.

The initial actions took place in Vale dos Buritis and Sítio Latão. In Vale dos Buritis, the project explored the relationship between geotourism and heritage conservation, including discussions on local fossils. In Sítio Latão, activities focused on the significance of the Araripe Geopark and conservation efforts, with educational initiatives implemented at the Palmeira community school. The project’s activities were disseminated through MPPCN’s social media to enhance public outreach (Pinheiro et al., 2021).

The municipality of Santana do Cariri is classified as a geographically isolated destination, as it is not located on a transit route to other cities. Consequently, its visitor flow consists primarily of individuals who intentionally travel to the region, driven by an interest in its cultural, scientific, and religious heritage.

In contrast to the size of the local population, the museum registers an annual average of 25,933 domestic and international visitors (Pinheiro; Junior, 2021). This expressive number shows that the museum is one of the main scientific tourism destinations in the Araripe Region, Ceará, highlighting its relevance in the national and international context.

The intentional choice to visit Santana do Cariri also underscores the relevance of the museum, which attracts a diverse audience, including students from public and private schools, university students, Brazilian and international researchers, and paleontology enthusiasts. This varied visitor profile significantly contributes to the strengthening of tourism in the region. The same applies to the Araripe Geopark, which plays a central role in promoting geotourism in the Cariri region while safeguarding the geological, paleontological, ecological, and cultural heritage of the Chapada do Araripe (Cordeiro; Macedo; Bastos, 2015).

The MPPCN stands out as a center of scientific and cultural tourism in the Cariri Region, attracting scientists, students, and visitors interested in paleontology and geology every year. This diverse audience is attracted by the possibility of exploring scientific exhibitions and local geological history, as well as fossils preserved in the region. The experience is enriched by visits to the museum, educational activities, and explorations of fossiliferous sites in the area, highlighting the museum as a center for scientific dissemination and appreciation of the natural heritage.

3.1.1 Religious Tourism in the Region

In addition to scientific tourism, Santana do Cariri has emerged as an important destination for religious tourism, driven both by the devotion to the patroness of the

city, Senhora Santana and by the recent beatification of Beata Benigna Cardoso da Silva (1928-1941).

The martyrdom of Benigna was officially recognized by Pope Francisco in October 2019, conferring on her the title of blessed and the classification of martyr for chastity by the Catholic Church. Known as the “heroine of chastity” for having been murdered at age 13 while defending her virginity, Benigna is the first blessed of Ceará and the fourth martyr of Brazil (Hirata, 2023).

This new attraction has increased the flow of visitors, who seek not only to explore the paleontological wealth of the museum but also to experience the spiritual dimension provided by the religious recognition of Benigna, expanding the cultural and tourist relevance of the city (Queiroz et al., 2023).

In this context, scientific and religious tourism provides a strategic opportunity for the region, promoting the development of new attractions and expanding local tourism potential, which can generate additional employment and income opportunities for the inhabitants of the Araripe Geopark territory, which are distributed among the municipalities of Barbalha, Crato, Juazeiro do Norte, Missão Velha, Nova Olinda and Santana do Cariri (Fernandes et al., 2019).

Tourism is an essential economic activity in the service sector, encompassing hotels, infrastructure, transport, and the production of goods and services. In places with religious attractions, such as Santana do Cariri, which honors Blessed Benigna Cardoso, tourism has grown significantly. The construction of the monument at the city's entrance in 2022 marked a milestone in tourism promotion, resulting in adaptations to the local infrastructure, commerce, and services, and boosting religious tourism, which complemented the city's existing recognition in paleontological and ecological tourism (Queiroz et al., 2023).

The Benigna religious tourist complex, which is currently in the final stages of construction, will include a 26-meter-tall statue of the young blessed and infrastructure to welcome more than 100,000 pilgrims, with areas for prayer, parking, and large

celebrations. This expansion should increase religious tourism, encourage the flow of visitors, and diversify tourist activities, confirming Santana do Cariri as a destination of cultural and spiritual relevance (Silva et al., 2023).

In light of the above, this study aimed to analyze the impact of the Museu de Paleontologia Plácido Cidade Nuvens (MPPCN) on the development of scientific tourism and its socioeconomic effects in Santana do Cariri, emphasizing its central role in fostering tourism and cultural activities in the region.

3.1.1.1 History of the museum

In the city of Santana do Cariri, in the Cariri Cearense region, a remarkable structure was built in the 1920s. This construction, which was initially supervised by the apothecary Joaquim Ferreira Lima, gained prominence in the late 1940s, during the administration of Antônio Onofre Cidade. The building functioned as the “Bar Cidade,” serving as a central gathering space for business travelers and visitors, particularly during the festivities in Santana do Cariri (Figueiredo, 2016; Saraiva et al., 2021).

After the bar closed, the space was used by the Ceará Agricultural Development Company (Companhia de Desenvolvimento Agrícola - CODRAGRO), a company dedicated to the commercialization of agricultural implements. Later, during the administration of Mayor Mozart Eudes de Magalhães (Arena), elected in the 1972 municipal elections, the city hall acquired a building that would later become the Museu de Paleontologia de Santana do Cariri, marking a new phase in its history (Saraiva et al., 2021; URCA, 2021; TRE-CE, 1972, p. 134).

The MPSC was conceived during the centenary celebrations of the city, which occurred on November 25, 1985 (figure 3). Under the management of the then-municipal mayor, Professor Plácido Cidade Nuvens (1943 - 2016) a proposal for the creation of the museum was sent to the City Council. After approval, Law No. 173/85, dated April 18, 1985, was subsequently enacted, granting authorization for the installation of the museum in this building and making it official as a museum space (Figueiredo, 2016).

Figure 3 – URCA Museum of Paleontology: 1985 to 1998



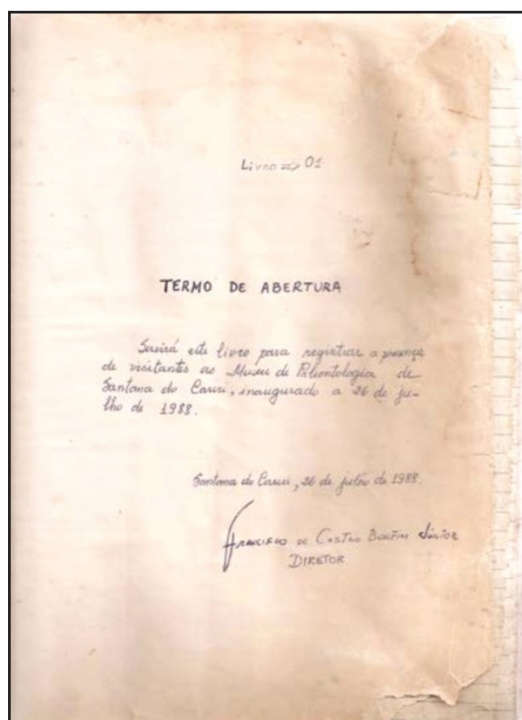
Source: Modified from Figueiredo (2016). Caption: Facade of the Museum from 1985-1998. Museum of Paleontology of URCA

On April 12, 1988, through a loan agreement, the museum was assigned to the URCA by Santana do Cariri City Hall for 30 years (figure 4). The opening ceremony took place on July 26, 1988, and was attended by several personalities and thousands of guests. Bishop Newton de Holanda Gurgel, bishop of the Diocese of Crato, blessed the premises. The renowned writer and politician from Ceará, Father Antônio Batista Vieira, played the role of witness in the contract signing ceremony, which was formalized by Rector José Teodoro Soares (Saraiva et al., 2021).

The initial collection and museum exhibition were obtained through donations from the local community, representing the first initiatives for the preservation of museological material (Ferreira et al., 2016).

In 1991, the museum was officially integrated into the governing body of the URCA. Despite the inauguration of the museum in Santana do Cariri in 1988, the Universidade Regional do Cariri lacked space dedicated to conducting paleontological research and restoring and preparing fossiliferous material in the Cariri region (Saraiva et al., 2021).

Figure 4 – Opening Statement of the Plácido Cidade Nuvens Museum of Paleontology



Source: modified from Saraiva et al. (2021). Caption: Opening letter of the Museu de Paleontologia Plácido Cidade Nuvens, inaugurated on July 26, 1988

In 2003, with the establishment of the Laboratory of Paleontology (LPU), the first studies on fossils from the Araripe Basin conducted by the URCA became feasible.

These studies were initially carried out by researchers and students from the Cariri region, whereas prior research on the basin had been conducted by scientists from other regions of Brazil (Figueiredo, 2016; Saraiva et al., 2021). Since its creation, the laboratory has been essential in promoting scientific initiation at the institution, collaborating closely with the MPPCN. The program offers undergraduate students research opportunities, fostering skills in scientific methodology and critical thinking, which are crucial for their academic and professional development, particularly in fields like paleontology.

This partnership has been instrumental in curatorship, the preparation and restoration of museological materials, the development of exhibitions, and the promotion of educational campaigns, involving researchers and students both from

the institution and in collaboration with other laboratories, both within and outside the region.

Following the passing of Professor Plácido Cidade Nuvens in 2016, the museum was renamed in his honor, reflecting his significant contributions to the advancement of paleontology and the cultural heritage of the region. With a collection of more than 10,000 fossils, mainly from the Cretaceous, the museum is essential for the study of Mesozoic evolution and paleoecology. In addition to its academic function, it promotes scientific dissemination through permanent and traveling exhibitions, guided tours, and educational activities for schools and the general public (figure 5) (Ferreira et al., 2016).

In 2021, the museum was officially recognized as a cultural heritage site of Santana do Cariri through a bill authored by Councilman Arclebio Dias (MDB) and sanctioned by Mayor Samuel Cidade Werton (PT) on September 30. This recognition facilitated fundraising and partnerships while promoting cultural rights and the dissemination of local heritage.

In the same year, Municipal Law No. 954/2021, enacted by Mayor Samuel Cidade, mandated the inclusion of basic paleontology and fossil heritage concepts in the municipal school curriculum. The law designated the Museum of Paleontology, established by Law No. 197/85, as the institution responsible for training public school teachers to teach these topics.

The recognition of the MPPCN as a cultural heritage site of the municipality paved the way for significant investments and improvements in its structure, which are being supplied by investments from the state government of Ceará.

Figure 5 – Plácido Cidade Nuvens Museum of Paleontology: Present Day



Source: modified from Saraiva et al. (2021). Caption: Current Facade of the Plácido Cidade Nuvens Museum of Paleontology and guided tours organized by the educational department

3.1.1.1.1 The collection

The collection of the MPPCN includes a diverse range of fossil groups, with emphasis on petrified trunks; impressions of ferns (ferns); mollusks; arthropods (including crustaceans, arachnids and insects); cartilaginous fish (sharks and rays); and bony fish, as well as representatives of amphibians and reptiles, including turtles, lizards, crocodylomorphs, pterosaurs and dinosaurs (Saraiva et al., 2021).

Most of the fossiliferous material present in the collection comes from the Santana Group, specifically from the Crato, Ipubi, and Romualdo Formations, which belong to the Araripe Basin. The museum also has full-scale replicas of dinosaurs and pterosaurs and models of the Araripe Basin that are part of the permanent exhibition (URCA, 2021).

3.1.1.1.1.1 Repatriation of museum assets from the Araripe Basin

The Araripe Basin, which is located in northeastern Brazil, covering the states of Ceará, Pernambuco, and Piauí, is widely recognized as one of the main sedimentary deposits containing fossils in the world (ASSINE, 2007). Its remarkable paleontological

diversity led to its inclusion in the prestigious global network of UNESCO geoparks, highlighting its scientific and heritage value.

Currently, the MPPCN plays a key role in the preservation, repatriation, and inspection of fossils as well as in supporting scientific research and promoting cultural and technical-scientific exchanges. Additionally, it became a catalyst center for tourist and cultural activities in the Araripe Geopark region (Mochiutti et al., 2012) under the auspices of UNESCO and was created with the main objective of safeguarding the fossiliferous heritage of the Araripe Basin.

The fossils preserved at this institution are highly relevant from scientific, historical, and cultural perspectives. These fossilized remains contain crucial information about the evolution of life forms over time, the processes of geological formation of the Earth, and the understanding of preserved paleoenvironments.

However, owing to its location in the semiarid region of the Northeast Region of Chapada do Araripe, even with educational campaigns, the region still faces a significant problem of smuggling, where locals find fossils and sell them through intermediaries (Silva et al., 2023; Simões; Caldwell, 2015).

Documented accounts of this trafficking have received wide coverage in the national and international media in recent decades, with vehement repudiation of scientific colonialism. News reports have revealed that illegally exported fossils ended up in museums and private collections, such as the case of the spider *Cretapalpus vittari*, which was deposited at the University of Kansas in the United States. Similarly, *Ubirajara jubatus*, the first nonavian dinosaur with feather-like structures found in South America, was removed from Brazil in the 1990s and was deposited at the State Museum of Natural History Karlsruhe, Germany (Cisneros, 2023; Downen; Selden, 2021). Both fossils were recently repatriated in partnership with the Ministry of Science, Technology and Innovation (MCTI) and are now located at the MPPCN in Santana do Cariri (CE) (Pinheiro et al., 2022).

4 CONCLUSIONS

Santana do Cariri has established itself as a scientific and cultural center recognized for its national and international paleontological relevance. This notoriety is due mainly to the MPPCN and the Araripe Geopark, which integrate science and tourism, promote socioeconomic development, and preserve the paleontological heritage of the Araripe Basin. With a collection of fossils of international importance and strategic location, the museum acts as a center for scientific tourism, attracting specialists and visitors, playing a central role in the preservation and dissemination of paleontological knowledge, and consolidating itself as one of the main centers of research and the scientific tourism in Brazil.

The MPPCN promotes research, education, and community engagement and is notable for its initiatives that bring the population closer to paleontological science, attracting researchers, students, and tourists.

Community engagement with paleontology in Santana do Cariri occurs through initiatives led by the MPPCN and Geopark Araripe, integrating research, education, and tourism. The Expanded Museum Project implemented interactive activities, workshops, and guided tours to enhance access to paleontology in historically underserved areas with low visitation rates. These initiatives addressed geotourism, heritage conservation, and environmental education, fostering the appreciation of paleontological heritage. Dissemination through MPPCN's social media expanded the project's reach, reinforcing the museum's role in science communication.

Recently, the appreciation of the cultural heritage of Santana do Cariri, driven by the beatification of Benigna Cardoso and the strengthening of religious tourism, expanded the diversity of attractions, consolidating the city as a destination of cultural, scientific, and spiritual relevance

The integration of scientific and cultural tourism, along with strategic investments in infrastructure and public policies focused on heritage preservation

and tourism promotion, strengthens heritage conservation and drives the region's socioeconomic development. This scenario reinforces the role of the museum in the dissemination of knowledge and the conservation of the paleontological and cultural resources of Cariri.

The continuity of efforts to protect and enhance the cultural and natural assets of Santana do Cariri is essential for the sustainable development of the region. This model of preservation and tourism incentives contributes to economic growth and the consolidation of cultural identity with international recognition, for example, through the repatriation of fossils, which is crucial for preserving paleontological heritage and strengthening regional scientific research.

The return of these museum objects to Brazilian institutions broadens the access of the national scientific community and promotes regional research and scientific tourism. Additionally, the values of natural and cultural heritage are ensured through repatriation, ensuring the conservation and study of these resources in their original geographical and historical context.

ACKNOWLEDGEMENTS

The author expresses her gratitude to the Paleontology Laboratory at the Regional University of Cariri (URCA) and the Museu de Paleontologia Plácido Cidade Nuvens for their support. Special thanks are extended to the Cearense Foundation for the Support of Scientific and Technological Development (FUNCAP) for the Visiting Researcher Fellowship (PV1-0187-00014.01.00/21) and the funding provided under the Women in Science program (MLC-0191-00228.01.00/22, SPU N° 06281427/2022). I would like to thank Carina K. for the suggestion that formed the basis of this research, presented in the museum tourism course subject.

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How to quote this article

Barros. O. A. The Museu de Paleontologia Plácido Cidade Nuvens and the scientific tourism Potential in the Cariri Region, northeastern Brazil. **Ciência e Natura**, Santa Maria, v. 47, e90317, 2025. DOI: <https://doi.org/10.5902/2179460X90317>. Available in: <https://doi.org/10.5902/2179460X90317>.