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The Fossil Fishes of the "Rocha" Collection Housed in the Museu Nacional and the Types Described by Jordan & Branner in 1908

Os Peixes Fósseis da Coleção "Rocha" Depositados no Museu Nacional e os Tipos Descritos por Jordan & Branner (1908)

Márcia Aparecida dos Reis Polck[1], Marcia Cristina da Silva[2], Celso Lira Ximenes[3], Luciana Barbosa de Carvalho[4], Felipe Augusto Correia Monteiro[5]

[1]Agência Nacional de Mineração, Rio de Janeiro, RJ, Brasil
[2]Universidade Federal de Alagoas, Arapiraca, AL, Brasil
[3]Museu de Pré-História de Itapipoca, Itapipoca, CE, Brasil
[4]Universidade Federal do Rio de Janeiro, Museu Nacional, Rio de Janeiro, RJ, Brasil
[5]Instituto Federal de Educação, Ciência e Tecnologia do Ceará, Jaguaribe, CE, Brasil
E-mails: maf_reis@yahoo.com.br; marcia.silva@arapiraca.ufal.br, clx.ximenes@gmail.com, lucbcarvalho@gmail.com, felipemonteiroifce@gmail.com
Corresponding author: Márcia Aparecida dos Reis Polck; maf_reis@yahoo.com.br

Abstract

In 1908, D.S. Jordan & J.C. Branner described the following species of fossil fishes from the Araripe Basin: *Calamopleurus vestitus*, *Cearana rochae*, *Enneles audax*, and *Tharrias araripis*. Such material of the "Rocha Collection", that was made by Francisco Dias da Rocha (1869-1960), were passed on to the Government of the State of Ceará. In 1961, Carlos de Paula Couto, negotiated the donation of the paleontological collections for the Museu Nacional. We review herein the history of the fossil fishes of the "Rocha Collection" that was housed in the Museu Nacional in, with an emphasis on type material. The documents and literature were consulted, and the fossil fishes were examined and photographed. This material corresponds to 12 catalogue numbers, three of which are replicas of the type- material housed in the Department of Geology, California Academy of Sciences, in California. The remaining nine numbers encompass 27 specimens referring to original material. The represented taxa are: *Vinctifer comptoni*, *Notelops brama*, *Cladocyclus gardneri*, *Rhacolepis buccalis*, *Tharrhias araripis*, and *Brannerion sp*. The only type material found was *Cearana rochae*, currently a synonym of *Tharrhias araripis*. This historical rescue of the "Rocha" collection type material will facilitate the investigation of researchers studying the paleoichthyofauna of the Araripe Basin.

Keywords: Museu Rocha; Araripe basin; Fossil collection

Resumo

Em 1908, D.S. Jordan & J.C. Branner descreveram as seguintes espécies de peixes fósseis da Bacia do Araripe: *Calamopleurus vestitus*, *Cearana rochae*, *Enneles audax* e *Tharrias araripis*. Os espécimes pertenciam à "Coleção Rocha", de Francisco Dias da Rocha (1869-1960), e que foi repassada ao Governo do Estado do Ceará. Em 1961, Carlos de Paula Couto negociou a doação das coleções paleontológicas da "Coleção Rocha" para o acervo do Museu Nacional-Universidade Federal do Rio de Janeiro (MN-UFRJ). Dessa forma, o presente trabalho teve como objetivo revisar o histórico do acervo de peixes fósseis da "Coleção Rocha", que estava depositado no MN-UFRJ, com ênfase nos fósseis-tipo. Para isso, foram realizadas consultas de documentos e bibliografia existente, e os peixes fósseis foram analisados e fotografados. Esse material corresponde a 12 números de tombo, sendo três deles apenas réplicas do material-tipo que se encontra na Califórnia (Department of Geology, California Academy of Sciences). Os demais nove números, apresentam 27 exemplares referentes a material fóssil original. Os táxons representados são: *Vinctifer comptoni*, *Notelops brama*, *Cladocyclus gardneri*, *Rhacolepis bucallis*, *Tharrhias araripis* e *Brannerion* sp. Em relação ao material-tipo, apenas *Cearana rochae*, atualmente sinônimo de *Tharrhias araripis*, foi encontrado. Esse resgate histórico dos fósseis-tipo da "Coleção Rocha" facilitará a consulta de pesquisadores no estudo da paleoictiofauna da Bacia do Araripe.

Palavras-chave: Museu Rocha; Bacia do Araripe; Coleção de fósseis

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1 Introduction

The Museu Rocha was a private museum created by the agronomist and naturalist Professor Francisco Dias da Rocha (1869-1960), located in Fortaleza, state of Ceará, which existed from 1894 until 1959 (Paiva 2001). Including more than 10,000 specimens of plants, animals, rocks, minerals and fossils, his collection was known by many Brazilians and foreign researchers, since Dias da Rocha loaned and exchanged specimens (Holanda & Lage 2019), often sending material to Brazilians and foreign specialists to classify and/or identify them. He also published a bulletin of the Museu Rocha (only two volumes) that listed and described some of collections belonging to the museum (Rocha 1908, 1911). This institution was considered as the third museum of Natural History in Brazil, preceded only by the Museu Nacional and the Museu Paulista (Nomura 1965).

As Dias da Rocha became older, it became difficult to him to maintain his collections, so he divided them and gave parts of their collections to various institutions (Almada 2008; Paiva 2001). When he turned 90 years old, Dias da Rocha donated the rest of the Museu Rocha collection to the Governments of the São Paulo State and Ceará State, which transferred the collection to the "Secretaria de Agricultura" (agriculture bureau) (Paiva 2001). Part of the paleontological collection was lost or mixed with other collections while being moved and shared.

After the transfer of the Museu Rocha to the Government of Ceará State, the majority of that museum, which included the geological and paleontological collections, was transferred to the Instituto de Educação do Ceará (former Escola Normal) (Ximenes et al. 2012). This institution maintained the collection under the name "Museu Dias da Rocha" and used it as a didactic laboratory in teacher training courses, until the mid-1990s (Ximenes et al. 2012). When it was definitively closed, its remnants were transferred to the Museu do Ceará in 2005 (Ximenes et al. 2012).

In 1961 the paleontologist Carlos de Paula Couto of the Museu Nacional hear about the transfer of the fossil collection from the Museu Rocha to the Instituto de Educação do Ceará. Then he negotiated with the direction of this institution the donation of the fossil collection, which happened the following year (Paula-Couto 1962; Santos 1963). Thus, this incorporated the Museu Rocha collections of fossil fishes of the Araripe Basin (Cretaceous), mammal fossils (Pleistocene) from several locations of Ceará and the collection of geology and mineralogy of the extinct institution into the collection of the Museu Nacional.

The fossil fishes that were part of the original collection of the Museu Rocha included some of the type material described in the early 20th century by David Starr Jordan and John Casper Branner, from the California Academy of Sciences, Stanford University (Jordan & Branner 1908). Henriques et al. (2002) mentioned that this material was donated to Museu Nacional by Francisco Dias da Rocha himself, nevertheless, they did not report of the holotypes described by Jordan and Branner (1908), which were also part of the original collection of the Museu Rocha. The whereabouts of these specimens were uncertain.

This study reviewed the history of the fossil fishes of the "Rocha" collection that was housed in the Museu Nacional of the Universidade Federal do Rio de Janeiro (UFRJ), with an emphasis on the type material described by Jordan and Branner (1908). However, the fire that occurred on September 2, 2018, at the Museu Nacional/ UFRJ impacted the collection, or at least a large part of it, including the paleontological collections. A great effort was made to rescue the collection of the Museu Nacional, which saved pieces from the paleovertebrate collection: due to their formation and the materials with which they were conserved, the fossils of the collection were generally little affected. Thus, this work can also contribute to the recovery of information about the history of the paleovertebrate collection of the Museu Nacional/UFRJ.

2 The Rescue of Paleontological Collection from the Museu Nacional

The Museu Nacional/UFRJ Collection Rescue Center was officially established on September 9, 2018, shortly after the fire that had occurred on September 2 of the same year. The Rescue Center was staffed by public servants from the Museu Nacional itself and they were responsible for rescuing the collections that survived the accident, whether they be scientific collections or architectural heritage.

In the following months, the work took place amid the rubble generated not only by the fire, but also by the collapse of the roof and the upper floors. Despite all of the destruction, some scientific collections managed to resist damage; primarily those collections whose specimens had minerals and metals in their composition; such as those of the paleovertebrate collection, which allowed the rescue of the majority of its content, principally, the specimens that were in the collection's cabinets. The specimens on display suffered more damage and some were completely lost.

The activities of the Collection Rescue Center continue through the inventory, which will produce more accurate data on the quantity recovered by identifying the specimens that were saved and those that were lost. It will also allow identify the degree of impact that the accident caused on each specimen, assisting in future restoration initiatives.

3 Material and Methods

The information about the collection was obtained from historical documents, digital databases, and existing literature. These data detail the movement of fossil fishes from the "Rocha" collection, which belonged to the former Museu Rocha and now are housed in the National Museum of Natural History's paleobiology collection, in the fossil collection of the California Academy of Sciences and others that were housed in the paleovertebrate collection of Museu Nacional/UFRJ.

3.1 Institutional Abbreviations

RC, "Rocha" collection from the former Museu Rocha; **CAS**, California Academy of Sciences in San Francisco, United States of America**; NMNH,** National Museum of Natural History of the Smithsonian Institution, Washington DC, United States of America; **MN**, Museu Nacional of the Universidade Federal do Rio de Janeiro (**UFRJ**), Rio de Janeiro, Brazil.

All fossil fishes from the "Rocha" collection that were housed in the Museu Nacional/UFRJ were examined and photographed in mid-2017. These specimens and the others described by Jordan and Branner (1908) were preserved in calcareous concretions from the Romualdo Formation of the Santana Group, Araripe Basin, Northeast Brazil (Assine et al. 2014). Jordan and Branner (1908) indicated that most of these specimens came from "Barra do Jardim," currently belonging to the municipality of Jardim, Ceará State.

3.2 The Araripe Basin and its Paleoichthyofauna

The Araripe Basin is an interior basin located in Northeast Brazil, between the states of Ceará, Pernambuco, and Piauí (Carvalho & Melo 2012; Carvalho et al. 2012), is known worldwide for the quantity and quality preservation of its fossils.

During the Mesozoic reactivation of the megafratures, Pernambuco Lineament and Paraíba/Patos Lineament resulted in the formation of the Araripe Basin and other sedimentary basins in the Northeast of Brazil. These events are related to the break-up of Gondwana and the associated opening of the South Atlantic Ocean (Carvalho et al. 2012).

The sedimentary sequences of the Araripe Basin are deposited on a base of pre-Cambrian magmatic and metamorphic rocks (Carvalho & Melo 2012; Carvalho et al. 2012) and the Mesozoic sedimentary layers are subdivided in the following lithostratigraphic units from bottom to top: Vale do Cariri Group (Brejo Santo, Missão Velha and Abaiara Formations), Santana Group (Barbalha, Crato, Ipubi, and Romualdo Formations) and Araripe Group (Araripina and Exu Formations) (Assine et al. 2014).

Its paleobiota includes microfossils, palynomorphs, vegetables, invertebrates, and vertebrates (e.g., Maisey 1991; Martill et al. 2007; Saraiva et al. 2015; Sayão et al. 2015). The fishes are the dominant group of the macrofossils (Polck et al. 2015).

The paleoichthyofauna here studied are preserved in calcareous concretions, of the Aptian-Albian age, from the Romualdo Formation, Santana Group. These calcareous concretions represent the moment that a marine transgression connected the western part of Thethys sea with the Araripe Basin (Arai 2014; Berthou 1990; Beurlen 1966; Mabesoone & Tinoco 1973; Assine et al. 2014).

4 The "Rocha" Collection Fossil Fishes Deposited in the Museu Nacional/UFRJ

After the material from the "Rocha" collection arrived at the Museu Nacional/UFRJ, it received another catalogue number, which was different from the previous number at the Rocha Museum. At the Museu Nacional/UFRJ, the original fossils were listed in nine different catalogue numbers and the replicas in three others.

It should also be noted that the amount of fossils does not correspond to the amount of catalogue numbers. Since some numbers include more than one specimen and, in other cases, parts of the same individual are found in more than one catalogue number. Thus, these nine catalogue numbers that are original material of the "Rocha" collection amount 27 fossils (articulated individuals or fragments thereof).

Below is the list of fossils with their catalogue number in the Museu Nacional/UFRJ collection, the correspondent catalogue number of the "Rocha" collection, the amount of specimens per lot, general observations and to which taxa the specimens are related (Table 1):

The list of the identified taxa following the respective catalogue number in the collection of the Museu Nacional (MN), respective number that was used in the Museu Rocha (CR), number of specimens (Qty.) and observations about the studied specimens.

Table 1 List of fossils analyzed from the "Rocha" collection (CR) that were deposited in the Museu Nacional/UFRJ (MN).

Taxon	MN	CR	Qty.	Observations+
Vinctifer comptoni	MN 3432-V*	06*	13	Miscellaneous fragments
Cladocyclus gardneri	MN 3433-V	26 and 30	02	Two different specimens
Brannerion sp.	MN 3437-V	15	02	CR 15 posterior part
	MN 3487-V			CR 15 anterior part
Rhacolepis buccalis	MN 4492-V	11	01	Counterpart replica, "*Brannerion vestitum*" paratype CAS 58295
	MN 3434-V	14	01	Flattened and worn body
	MN 3435-V	09 and 19	02	Two different specimens
Notelops brama	MN 3432-V*	06*	01	Isolated head
	MN 3442-V	21	01	CR 21 posterior part
	MN 3436-V		01	CR 21 anterior part
Tharrhias araripis	MN 3468-V	05	02	Original part, holotype *"Cearana rochae"*
	MN 4494-V			Counterpart replica, "*Cearana rochae*" paratype CAS 58297
	MN 4493-V	04	01	Counterpart replica, *Tharrhias araripis* paratype CAS 58318

+general observations, more details in the "Results" section
*repeated in the table

5 Results

Vinctifer comptoni (Agassiz 1841)
(Figure 1)

Examined material: MN 3432-V - CR 06 counting 14 specimens, 13 from *V. comptoni* (Figure 1) and one from *Notelops brama* (Figure 2).

Description and comments: MN 3432-V lot with 14 specimens, of which 13 parts have partially preserved bodies, heads, and, in some specimens the anterior part of the body is visible. All 13 specimens have bright scales with ganoine, "peg-and-socket" joint and dorsoventrally deep elongated on the flank. These characteristics of *V. comptoni* are quite visible. Jordan and Branner (1908) had identified lot CR 06 and CR 07, CR 10, CR 23, CR 24, CR 27, CR 28, CR 29, and CR 31, characterizing the presence of different fragments from five to six different individuals with different sizes. The largest specimen, CR 07, along with the specimens CR 10 and CR 27 were donated to the "United States National Museum", currently the National Museum of Natural History of the Smithsonian Institution. The available digital databases show that CR 07, CR 10, and CR 27 correspond to the NMNH V 6009 lots: NMNH V 6010 and NMNH V 6011 of that institution.

Cladocyclus (Agassiz 1841)
Cladocyclus gardneri (Agassiz 1841)
(Figure 3A and 3B)

Examined material: MN 3433-V (includes two specimens CR 26 and CR 30).

Description and comments: CR 26 is a fragment, a large part of the body with preserved prominent cycloid scales (Figure 3A); CR 30 another fragment of a caudal fin with some preserved bones (Figure 3B). CR 26 and CR 30 are the same specimens studied by Jordan and Branner (1908).

Brannerion Jordan, 1919
Brannerion sp.
(Figure 4 and 5A)

Examined material: MN 3437-V and MN 3487-V (CR 15, a single specimen that was broken into two parts); MN 4492-V (replica of CAS 58295, paratype of "*Brannerion vestitum"*, counterpart of CR 11).

Description and comments: MN 3437-V is the larger and posterior part of the CR 15 specimen body, moderately sized cycloid scales, strongly imbricated, anal fin originates beneath the posterior level of the dorsal fin, with part of the fin rays, dorsal and anal fins preserved (the long rays of these anal and dorsal fins are diagnostic features of *Brannerion*), caudal fin not preserved; MN 3487-V is the smaller and anterior portion of the body of CR 15, although part of the head is preserved, the bones could not be identified due to the preservation (Figure 4); MN 4492-V is a replica of the counterpart CAS 58295, which was designated as a paratype of "*Calamopleurus vestitus*" (Jordan & Branner 1908), currently synonym of "*Brannerion vestitum*" (Figure 5A) (Jordan & Branner 1908).

Figure 1 *Vinctifer comptoni* (MN 3432-V, CR 06), a lot with 13 specimens. Scale: 4 cm.

Figure 2 *Notelops brama* (MN 3432-V, CR 06) a single individual from *N. brama* of the lot, who had been mistakenly identified as *V. comptoni.* Scales: 2 cm.

Rhacolepis buccalis Agassiz, 1841
(Figure 6)

Examined material: MN 3434-V (CR 14); MN 3435-V (includes two specimens, CR 09 and CR 19).

Description and comments: MN 3434-V (CR 14) presents the body without the anterior part of the head (anterior to the opercle) and without a caudal fin, ovoid and small scales, some vertebrae visible in the posterior part of the body, parts of the pectoral fin with 14 visible rays (Figure 6C). MN3435-V (CR 09 and CR 19) are two fragments including only the anterior half of the body. In CR 19, the small and ovoid scales are preserved in some parts of the body and the few bones in the skull cannot be identified as they are very flattened. In the CR 09 (Figure 6A), bones of the head are damaged, and only the opercle and the subopercle could be identified; it is possible to see part of the pectoral fin with some well-separated rays. CR 19 (Figure 6B) is described by Jordan and Branner (1908) as belonging to the species *Rhacolepis latus* (Agassiz 1841) synonym of *Brannerion latum* (Agassiz 1841), but they also mention the possibility that this specimen is just a laterally flattened individual of *R. buccalis*. The other specimens CR 09 and CR 14 are not represented or mentioned by Jordan and Branner (1908). The authors also mention specimens CR 08, CR 09, CR 16, and CR 17, as well as other materials of *R. buccalis* and CR 18 of "*R. latus*." However, the whereabouts of these other specimens are unknown.

Notelops (Woodward 1901)
Notelops brama (Agassiz 1841)
(Figure 7)

Examined material: MN 3442-V and MN 3436-V (CR 21, two parts of a single specimen of *N. brama*); MN 3432-V (CR 06, including 14 specimens, 13 from *V. comptoni* and one from *N. brama*).

Description and comments: MN 3442-V is the front part of the body includes a head and a small part of the rest of the body, with pectoral fin and MN 3436-V is the middle part of the body with small cycloid scales, part of the dorsal fin, and part of the pelvic fin that originates after the posterior of the dorsal fin. Both parts (MN 3442-V and MN 3436-V) form a single individual, CR 21 (Figure 7). As anteriorly mentioned, MN 3432-V (CR 06) was represented by 14 specimens previously identified as all belonging to the species *V. comptoni.* However, one of these specimens had characteristics of the species *Notelops brama*: anterior parts of the body with some skull bones, showing small and smooth cycloid scales, thin and prominent teeth, three large bones behind the orbit (infraorbital 2 and 3 and the dermophenotic), and only two bones can be observed on the posterior margin of the preopercle, the opercle, and the subopercle (Figure 2) (see Polck et al. 2015).

Tharrhias (Jordan & Branner 1908)
Tharrhias araripis (Jordan & Branner 1908)
(Figure 5B, 5C and 5D)

Examined material: MN 3468-V (Described as "*Cearana rochae*" holotype, original part of CR 05); MN 4493 (replica of *Tharrhias araripis* paratype CAS 58318, counterpart of CR 04) and MN4494 (replica of "*Cearana rochae*" paratype CAS 58297 counterpart of the CR 05).

Description and comments: MN 3468-V (CR 05) is the holotype of "*Cearana rochae*" (Jordan & Branner 1908) (Figure 5B). The CAS 58297 is its paratype the counterpart, whose replica was housed in the MN (MN 4494) (Figure 5C); CR 05 has a partially preserved body, part and counterpart, quadrangular-shaped small and thin scales, without enamel, resembling the appearance of a "corn cob," incomplete head, large opercle, which is higher than it is wide, and preopercle present; although the pectoral, dorsal, and pelvic fins were present, the back and caudal fins were not preserved in CR 05. MN 4493 is a replica of the CAS 58318 paratype counterpart of *T. araripis* (Figure 5D): the location of the original CR 04 part, the *T. araripis* holotype, is unknown, as it was not among the specimens studied in the MN. Jordan and Branner (1908) also mention the CR 01, CR 03, and CR 32 specimens.

CR 01 and CR 03 were described as additional specimens of *T. araripis*. The location of CR 01 is unknown. While Jordan and Branner (1908) mention that the CR 03 was donated to the "United States National Museum", currently the Smithsonian Institution's National Museum of Natural History. The available digital databases show that CR 03 now corresponds to the NMNH V 6012 lot of that institution. CR 32 was another specimen mentioned by Jordan and Branner (1908) as corresponding to the species "*Cearana rochae*", its whereabouts are unknown.

Figure 3 *Cladocyclus gardneri* (MN 3433-V): A. CR26; B. CR30. Scale: 4 cm.

Figure 4 *Brannerion* sp. MN 3487-V (anterior part of CR 15) and MN 3437-V (posterior part of CR 15). Scale: 4 cm.

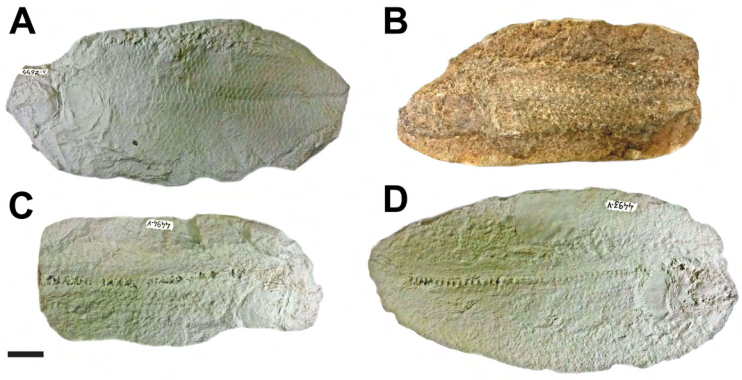

Figure 5 Fossils of the "Rocha" collection, described by Jordan and Branner (1908) housed in the Museu Nacional/UFRJ. A. MN 4492-V (CR11), replica of CAS 58295, counterpart of the "*Calamopleurus vestitus*", which is currently synonym of "*Brannerion vestitum*"; B. MN 3468-V (CR 05) holotype and original part of the "*Cearana rochae*," currently considered synonym of *Tharrhias araripis*; C. MN 4494-V (CR 05) replica of CAS 58297 paratype counterpart of the "*Cearana rochae*"; D. MN 4493-V (CR 04) replica of CAS 58318 paratype counterpart of the *T. araripis*. Scales: 2 cm.

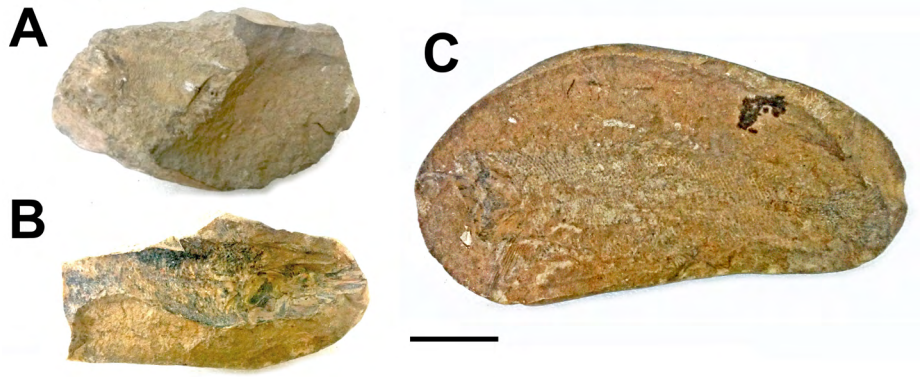

Figure 6 *Rhacolepis buccalis:* A. (MN 3435-V) - CR 19; B. (MN 3435-V) - CR 09; C. (MN 3434-V) - CR 14. Scale: 4 cm.

Figure 7 *Notelops brama* (MN 3442-V) - anterior part of CR 21 and (MN 3436-V) - posterior part of CR 21. Scales: 4 cm.

6 Discussion

The type material described by Jordan and Branner, in 1908, and here studied herein are: "*Calamopleurus vestitus*" (Figure 5A), *"Cearana rochae*" (Figure 5B and 5C), and *Tharrhias araripis* (Figure 5D).

Subsequently, Jordan (1919) set the genus *Brannerion*, namely *B. vestitum* (Jordan & Branner 1908) as the type species of the genus and included *Calamopleurus vestitus* (Jordan & Branner 1908) as a synonym of this species.

Blum (1991a) recognized two nominal species for to the genus *Brannerion*, *B. vestitum* and *B. latum*. Forey and Maisey (2010) reviewed this genus and recognized two morphotypes of the genus, *Brannerion* sp. A. and *Brannerion* sp. B. However, the counterpart CAS 58295 (CR 11) of the type material of *B. vestitum* cannot be related to any of these forms. Neither Blum (1991a) nor Forey and Maisey (2010) recognized observable characters in the counterpart CAS 58295 (CR 11) that allow related this specimen with either of these two morphotypes of *Brannerion*. They both indicate that further analysis on morphology of type material (CR 11 major part and the counterpart CAS 58295) is necessary to determine to which these two morphotypes the "*B. vestitum*" are related. Thus, the present study considers the material MN 3437-V, 3487-V, and 4492-V only as *Brannerion* sp.

Also, Jordan (1921) included "*Cearana*" as a synonym of *Tharrhias*, but he maintained two distinct species *Tharrhias araripis* and *T. rochae*. However, the species *T. rochae* is no longer valid since it was considered synonym of *T. araripis* by Blum (1991b).

Tharrhias araripis is a common species, thus far only found in the Araripe Basin. It is mainly characterized by its small and toothless terminal mouth, not extending after the anterior margin of the orbit, and quadrangular-shaped small and thin scales, without enamel, resembling the shape of a corn cob (Blum 1991b; Wenz et al. 1993). The description of *Tharrihas araripis* (Jordan & Branner, 1908) was based on the specimen CR04 that was housed in the Museu Rocha, the original holotype part has been returned to the Rocha Museum while the paratype counterpart was housed in the California Academy of Sciences, currently housed in the Department of Geology, under CAS 58318. However, in the Museu Nacional/UFRJ only the replica of the counterpart the paratype CAS 58318 was found, listed under the number MN 4493-V.

Other specimen, CR 22 was also described by Jordan and Branner (1908) as a new species "*Enneles audax*". However, this taxon is considered a synonym of *Calamopleurus cylindricus* (Maisey 1991; Grande & Bemis 1998). CR 22 comprises a skull of about 15cm which the paratype is a small fragment of the counterpart and it's housed in the California Academy of Sciences CAS 58293. The large part of the specimen CR22 that is the holotype of "*Enneles audax*" was not found in the "Rocha" collection housed at the Museu Nacional/UFRJ in Rio de Janeiro, its location is unknown.

7 Final Considerations

The fossil fishes from the old "Rocha" collection that are housed in the Museu Nacional/UFRJ corresponds to 12 catalogue numbers, three of which are only replicas of the original material found in the Department of Geology at the California Academy of Sciences. The remaining nine catalogue numbers include a total of 27 fossil specimens referring to original material, some numbers have more than one specimen and in some other catalogue numbers a single individual is fragmented and have more than one catalogue number.

The represented taxa are: *Vinctifer comptoni, Notelops brama, Cladocyclus gardneri, Rhacolepis buccalis, Tharrhias araripis* and *Brannerion* sp.

Of the original type material of the "Rocha" collection described by Jordan and Branner (1908) and housed in the Museu Nacional/UFRJ, only the number MN 3468-V, referring to "*Cearana rochae*" (Jordan & Branner 1908), currently synonym of *Tharrhias araripis*, was found in this study, which was conducted before the fire of September 2, 2018. Other type specimens are represented only by the replicas that were present in the collection of the Museu Nacional/UFRJ, whose original specimens are maintained in the Department of Geology, California Academy of Sciences.

However, the following questions about the whereabouts of the other type fossils have not been clarified, such as: 1) In the Museu Nacional/URFJ Collection, only the replica of the counterpart of CR 04, the paratype of *Tharrhias araripis* (MN 4493-V) was found. The original specimen CAS 58297 is housed with the California Academy of Sciences. As the material was described with part and counterpart, where is the holotype part?; 2) Likewise, the original counterpart of CR 05 the specimen CAS 58297 of "*Calamopleurus vestitus*" (Jordan & Branner 1908), which is currently synonym of *Brannerion vestitum* (Jordan & Branner 1908), is housed in the California Academy of Sciences and the replica MN 4492-V of this counterpart was listed in the collection of the Museu Nacional/UFRJ. Where are the holotype part? 3) The other type specimens figured in Jordan and Branner (1908) was CR22 "*Enneles audax*", but only the small fragment of the counterpart was found housed in the California Academy of Sciences CAS 58293. Despite "*Enneles audax*" is synonym of *Calamopleureus cylindicus*, their type specimens has historical value for the collection and the systematic paleontology. Where was the major fragment of the CR22, the holotype of "*Enneles audax*"?

This review of fossil fishes from the "Rocha" collection that were housed in the Museu Nacional/UFRJ will help researchers interested in the studying the paleoicthyofauna of the Araripe Basin. Moreover, with the damage caused by the fire in 2018, any documentary, academic, and photographic information is extremely important for the restoration and inventory of specimens from the paleovertebrate collection of Museu Nacional/UFRJ, assisting the recognition of the rescued materials.

8 Acknowledgments

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9 References

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Author contributions

Márcia Aparecida dos Reis Polck: conceptualization; formal analysis; investigation; methodology; validation; writing-original draft; writing – review and editing; visualization; supervision. **Marcia Cristina da Silva:** writing – review and editing; visualization. **Celso Lira Ximenes:** writing – review and editing; visualization. **Luciana Barbosa de Carvalho:** methodology; writing – review and editing; visualization. **Felipe Augusto Correia Monteiro:** methodology; validation; writing-original draft; writing – review and editing; visualization; supervision.

Conflict of interest

The authors declare no potential conflict of interest.

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