



The presence of hyperostosis in Atlantic moonfish, *Selene setapinnis* (Mitchill, 1815) in the Brazilian Coast - case report

[A presença de hiperostoses no peixe-galo-sem-penacho, *Selene setapinnis* (Mitchill, 1815) na costa brasileira - relato de caso]

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ABSTRACT

The occurrence of hyperostotic bones is common in marine fish, especially in the Carangidae family, despite few records of this condition in fishes from Brazilian waters. The present study describes the occurrence of hyperostosis in Atlantic moonfish (*Selene setapinnis*) in, Rio de Janeiro State, Brazil. Radiographs of the fish specimens were taken and all of them presented hyperostosis in at least three different regions: cleithrum, pterygiophores and pleural ribs. The observed pattern is different from previously described for other species of the same genus. It is the first record for the species and a valuable contribution to the study of bone diseases in fishes from the Brazilian coast.

Keywords: Carangidae, marine fishes, bone diseases

RESUMO

A ocorrência de ossos hipertostóticos é comum em peixes marinhos, especialmente na família Carangidae, apesar de poucos relatos dessa condição em peixes de águas brasileiras. O presente estudo descreve a ocorrência de hiperostose no peixe-galo-sem-penacho (*Selene setapinnis*) no estado do Rio de Janeiro, Brasil. Radiografias dos espécimes de peixes foram feitas e todos os exemplares apresentaram hiperostoses em pelo menos três regiões diferentes: cleithrum, pterigióforos e costelas pleurais. O padrão observado é diferente do descrito previamente para outras espécies do mesmo gênero. Este é o primeiro relato para a espécie e é uma contribuição valiosa para o estudo de doenças ósseas em peixes da costa brasileira.

Palavras-chave: Carangidae, peixes marinhos, doenças ósseas

INTRODUCTION

The increase of periosteal osteogenesis that modifies normal bone morphology is defined as hyperostosis (Meunier *et al.*, 2010). This condition causes bone thickening and swollen shape (Olsen, 1971; Desse *et al.*, 1981; Meunier and Desse, 1986; Gaudie and Czochanska, 1990; Smith-Vaniz *et al.*, 1995). Several families of marine teleost fishes are often described with the condition, although the etiology and implications

remain unclear. Different hypothesis about this disorder have been proposed.

Schlüter *et al.* (1992) suggested the presence of hyperostotic bones as a physiological response to chemically adverse environment. Gaudie and Czochanska (1990) described it as a possible genetic control. Lima *et al.* (2002) reported the high incidence of hyperostosis in individuals of cutlass fish *Trichiurus lepturus* (Linnaeus, 1758) as osteoma, a usual type of tumor described in fishes. Many authors considered hyperostosis as

non-pathological condition (Desse *et al.*, 1981; Gauldie and Czochanska, 1990.; Smith-vaniz *et al.*, 1995).

Hyperostotic bones is often observed in species-specific structures like haemal and neural spines, ribs, pterygiophores (Desse *et al.*, 1981), despite of taxonomically related species can exhibit different patterns for hyperostosis (Smith-Vaniz *et al.*, 1995). Tuna (2015) showed that the same individual can develop several affected regions simultaneously. Although the occurrence of hyperostosis apparently does not affect the consumption, it leads to a possible bacterial contamination and makes filleting difficult, causing loss of muscle tissue and imperfections in the cut (Giarratana *et al.*, 2012; Ramos and Faisca., 2016) which can make filleting process impossible at industrial level (Lima *et al.*, 2002). Smith-Vaniz *et al* (1995) describe the presence of this condition in 92 species divided into 22 families.

Even though a clear taxonomic pattern does not seem to exist, some studies demonstrate a high prevalence of hyperostosis in individuals from the Carangidae family (Smith-Vaniz *et al.*, 1995; Béarez, 1997; Chanet, 2018), a family with several species of commercial importance in the southeast-south of the Brazilian coast (Report..., 2018). The present study reports the occurrence of hyperostosis in specimens of *Selene setapinnis* (Mitchill, 1815). This is the first case reported for hyperostosis in this species and one of the few cases reported in Brazilian waters.

MATERIALS AND METHODS

Nine specimens of Atlantic moonfish were acquired in the Cabo Frio region, Rio de Janeiro, Brazil. The specimens were identified, sexed and biometrics were performed for total length, standard length, and total weight. X-ray radiography was conducted using the X-ray equipment MAG 300mA, performed in collimator calibrated 50 Kv/160mA in radiographic cassettes of 35 x 43 and 24 x 30cm. The radiographic images were processed using the software Sante Dicom Viewer Pro.

RESULTS

The mean and standard deviation for the total length of the fishes were 38.8cm \pm 1.28cm (ranged

from 36.5 to 40.5cm). The standard length averaged was 29.1cm \pm 1.58cm (ranged from 25.7 to 30.7cm). The average weight was 690.4g, with standard deviation \pm 64.2grams (ranged from 614 to 783g). All specimens analyzed had skeletal deformities, varying in number and type of affected structures.

Hyperostosis was found in pterygiophores of all analyzed specimens. The number of pterygiophores affected ranged from 15 to 23. The presence of this condition on both sides of the cleithrum was also observed in almost all individuals, except for one male specimen. Seven individuals had deformations in the first pair of ribs. Hyperostosis in the supraoccipital, haemal spines, neural spines or other bones were absent (Figure 1).

DISCUSSION

Only three structures were affected: cleithrum, ribs and pterygiophores. After the analysis of radiographic images, it was determined that with the pterygiophores the most affected structures considering the thickening and amount of bones (Figure 2). Male and female specimens had their bones affected, corroborating with previous studies that reported the development of condition in both genders (Lima *et al.*; 2002; Paig-Tran *et al.*; 2016).

The observed pattern for *S. setapinnis* in the present work was different from the described in previous studies for other species of the same genus. Béarez (1997) reported the presence of condition in the supraoccipital region in skeletons of individuals from *S. brevoorti* (Gill, 1863) and *S. peruviana* (Guichenot, 1866) found in archaeological sites in Ecuador. Guzman and Polaco (2002) observed the hyperostosis in the cranial region, cleithrum and neural spines in three individuals of *S. vomer* and *S. brevoorti* from zooarchaeological collections in Mexico.

Different patterns in related species can be found (Smith-Vaniz *et al.*, 1995; Rapisarda *et al.*, 2008). *Trichiurus lepturus* (Linnaeus, 1758) collected in different studies (James, 1960; Lima *et al.*, 2002; Al Nahdi *et al.*, 2016) the incidence of individuals with hyperostosis ranged from 94.5% to 10.5%. These differences in presence *versus* absence of the condition and patterns could not be analyzed as a single factor. The occurrence of hyperostosis

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related to a genetic factor (Smith-Vaniz *et al.*, 1995; Jawad, 2013) could explain the fact that species living in the same environment may present different prevalence, including the complete absence of condition. Physiological or environmental factors could justify the presence of this bone condition, as an aid to support the fin (erection aid), aging, temperatures, water

chemical composition, pathogenic factors, floating aid, hydrostatic maintenance, hypersaline environments, among others (Murty, 1967; Meunier and Desse, 1986; Smith-Vaniz *et al.*, 1995; Gaudant and Meunier, 1996; Chang *et al.*, 2008; Meunier *et al.*, 2008; Giarratana *et al.*, 2012; Paig-Tran *et al.*, 2016; Chanet, 2018).

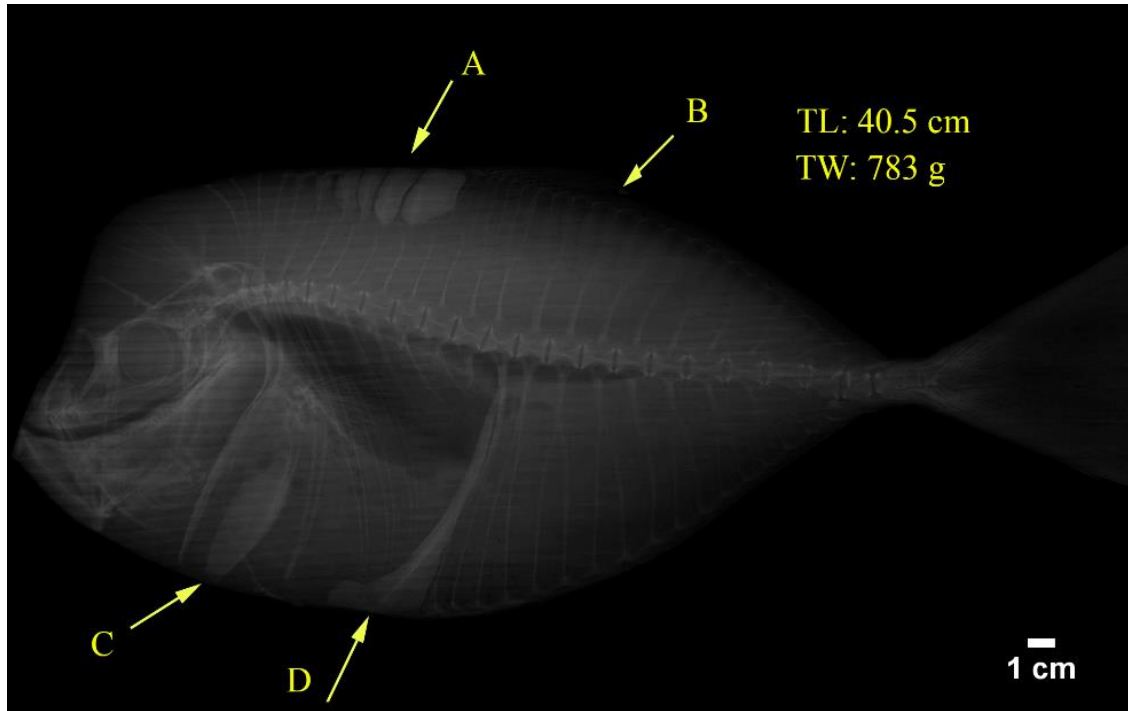


Figure 1. Radiography image of a specimen *S. setapinnis*, total length 40.5cm and total weight 783grams with the presence of hyperostosis observed in four distinct regions – A and B: Pterygiophores - C: Cleithrum - D: Rib. The condition is more evident in the first series of pterygiophores.

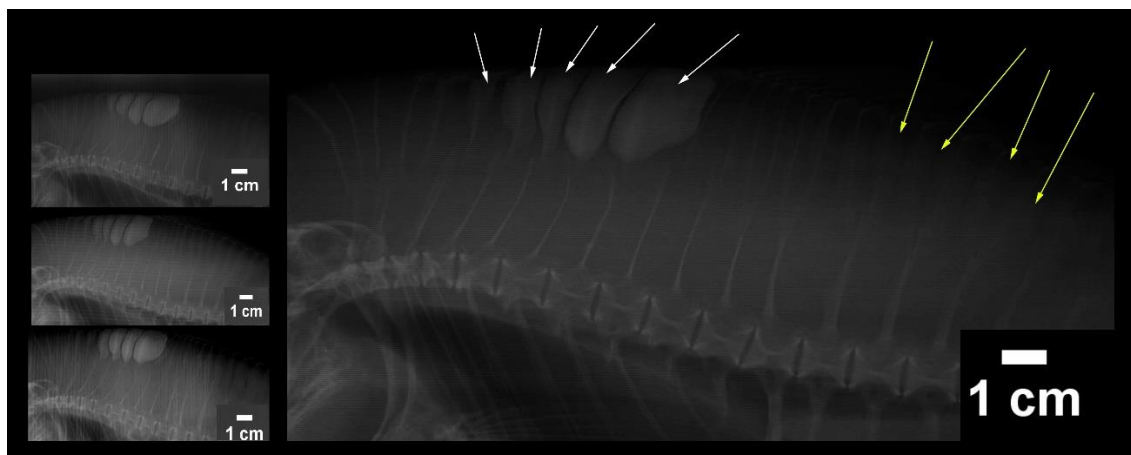


Figure 2. Radiographic images of dorsal view of four samples of *Selene setapinnis*, total length average 38.8cm, demonstrating the described pattern. The white arrows indicate the thickened affected pterygiophores and yellow arrows indicate pterygiophores with not evident process.

CONCLUSIONS

The present study is the first record of hyperostosis in different individuals of *Selene setapinnis* from southern-south waters of Brazil. The patterns described for the presence of hyperostosis differ from the affected bones of other species of the same genus. The cause of hyperostosis remains unclear and further research is necessary to elucidate future questions about the epidemiology of this disorder.

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