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# รายงานการพบของภาวะกระดูก Pachyostosis ครั้งแรกในปลาอินทรีย์ *Scomberomorus commerson* และปลาโฉมงาม *Alectis ciliaris* จากชายฝั่งอ่าวไทย

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**บทคัดย่อ:** ปลาอินทรีย์ (*Scomberomorus commerson*) และปลาโฉมงาม (*Alectis ciliaris*) เป็นปลาที่มีมูลค่าทางการค้าที่สำคัญในประเทศไทย แต่การศึกษาลักษณะทางสัณฐานวิทยาและกายวิภาคของกระดูกยังมีค่อนข้างน้อย การวิจัยครั้งนี้จึงมีวัตถุประสงค์เพื่อศึกษาลักษณะทางกายวิภาคและสัณฐานวิทยาของกระดูกปลาอินทรีย์และปลาโฉมงาม ซึ่งตัวอย่างปลาถูกเก็บรวบรวมจากจังหวัดระยอง ประเทศไทย ช่วงเดือนธันวาคม พ.ศ. 2562 การศึกษาจะอธิบายถึงลักษณะของกระดูกจากถ่ายภาพโดยใช้กล้องดิจิตอล จากการศึกษาพบภาวะ pachyostosis ซึ่งถูกพบเป็นครั้งแรกในปลาอินทรีย์และปลาโฉมงามจากชายฝั่งทะเลอ่าวไทย ภาวะนี้พบในบริเวณต่างๆ ของกระดูก ได้แก่ บริเวณกระดูกสันหลังส่วน neural spine, บริเวณกระดูกซูปราออคสิพิทอล supraoccipital, บริเวณกระดูกโพสต์ไคลธรัม postcleithrum และบริเวณกระดูก dorsal pterygiophore แม้ว่าภาวะกระดูกนี้จะไม่ส่งผลต่อการบริโภค แต่อาจจะก่อปัญหาสำหรับการแล่ปลาเพื่อแบ่งขายเชิงอุตสาหกรรม เนื่องจากมีภาวะนี้กระดูกตามแนวลำตัวของปลาด้วยเหตุดังกล่าวภาวะกระดูกนี้สามารถส่งผลต่อมูลค่าเชิงพาณิชย์สำหรับปลาเหล่านี้ได้

**คำสำคัญ:** ภาวะกระดูก pachyostosis ปลาอินทรีย์ ปลาโฉมงาม อ่าวไทย

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# First record of the case of pachyostotic bone in the Narrow-barred Spanish mackerel, *Scomberomorus commerson* and the African pompano, *Alectis ciliaris* from the coastal waters of the Gulf of Thailand

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**Abstract:** The Narrow-barred Spanish mackerel (*Scomberomorus commerson)* and the African pompano *(Alectis ciliaris)* were the important commercial value fish in Thailand. However, the morphology and the anatomy of the bone have not been studied. This research aimed to study the anatomy and the morphology of pachyostotic bone. The fish samples were collected from Rayong Province, Thailand during December 2019. The characteristics of bone were described and photographed by using a digital camera. The present study revealed the first finding of pachyostotic bone in these fish species from the coastal waters of the Gulf of Thailand. This study was found in different regions of pachyostotic bone including in the neural spine, supraoccipital, postcleithrum, and dorsal pterygiophore. Although the pachyostotic bone does not affect consumption, it may be a complication for filleting in fish processing industries as the presence of pachyostotic bone along the longitudinal axis of teleost. For this reason, pachyostotic bone can affect on a high commercial value of price such as the Narrow-barred Spanish mackerel.

**Keywords:** Pachyostotic bone, Narrow-barred Spanish mackerel, African pompano, Gulf of Thailand

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## Introduction

The abnormal bone of fish species has been reported in nature (Dawson and Heal,1971). In the case of pachyostotic bone, the researchers likely discuss the nomenclature linked to these forms as the regional (pachyostosis) benign bone tumor (Houssaye *et al*., 2016). The causes and the developments of pachyostotic bone are still unknown (Meunier *et al*,2010). Like the previous reports, the pachyostotic bone in teleost was found in the skull, supraoccipital, cleithrum, ribs, claviculae,

haemal, neural spines, and pterygiophores, (Smith-Vaniz *et al*.,1995). The pterygiophores are a series of chondral bone that support the dorsal and anal ray fins.

The Narrow-barred Spanish mackerel (*Scomberomorus commerson*) and the African pompano (*Alectis ciliaris*) are the important commercial fish from the coastal waters of the Gulf of Thailand. Especially, these fish are the high economic value in the market. To evident the knowledge of the deformities bone, this research aimed to conduct as anatomy and morphological study of pachyostotic bone in these species that were collected from the coastal waters of the Gulf of Thailand.

## Materials and Methods

The Narrow-barred Spanish mackerel (*Scomberomorus commerson)* and the African pompano *(Alectis ciliaris)* were collected from Rayong Province, Thailand during December 2019. Both fish samples were measured standard length, head length, body depth, fork length, dorsal fin length, anal fin length, and investigated the anatomy and the morphology of pachyostotic bone. The skeletal deformities were documented, especially including the length of the major and minor axis of each deformity. The gross anatomical and morphological study on pachyostotic bone only the part of the column that showed the skeletal deformities was described and photographed by using a digital camera and FCR capsular V view program.

## Results

This study is the first record of pachyostotic bone in the Narrow-barred Spanish mackerel, *Scomberomorus commerson*, and the African pompano, *Alectis ciliaris* from the coastal waters of the Gulf of Thailand. In this study, the characteristics of the pachyostotic bone only the part of the column were shown the lesions.

The morphological characteristics of *S. commerson* were determined by the Nelson guideline (2006). The standard length of *S. commerson* was 690.5 mm; head length, 110.5 mm; body depth, 180 mm; fork length, 580 mm; dorsal fin length, 85 mm; anal fin length, 83 mm. The skeletal deformities of *S. commerson* were found in the dry specimens. The pachyostotic bone was found in two regions; 1) the neural spine being the elongated shape and 2) the haemal spine being round shape. The regions of the spine were located in the first third part of the neural spine. The skeletal deformities on the neural spine and ribs showed a variety of sizes and shapes. The skeletal deformities on the neural spines of the 2 $^{nd}$ to 16 $^{th}$ vertebra and the skeletal deformities on the neural spines of the 10 $^{th}$ to 15 $^{th}$ vertebra.The largest pachyostotic bone was found in the neural spine of the 7 $^{th}$ vertebra (15 mm in maximum size width) and the haemal spine of the 13$^{th}$ vertebra (10.5 mm in maximum size width). On the other hand, the smallest hyperostotic bone was found in the haemal spine (15 mm in length and 8.1 mm in width) showing in figure 1.

**Figure 1** *Scomberomorus commerson* with the present of pachyostotic bone in haemal spine.

The morphological characteristics of *A. ciliaris* were determined by the Nelson guideline (2006). The standard length was 436.74 mm; head length, 125 mm; eye diameter, 34 mm; body depth, 230.48 mm; fork length, 510.2 mm; dorsal fin length, 131.27 mm; anal fin length, 98.3 mm. The skeletal deformities in *A. Ciliaris* were found in the fresh specimens. The pachyostotic bone of *A. ciliaris* was found in four regions; 1) the supraoccipital area being the largest size; 2) the dorsal pterygiophore; 3) the postcleithrum and 4) the ribs being the smallest size. The largest pachyostotic bone was found in the supraoccipital area with oval borders (70.22 mm in length and 36,85 mm in width). In contrast, the smallest hyperostotic bone was found in the dorsal pterygiophore (6.81 mm in length and 6.21 mm in width)as show in figure 2. Moreover, the pachyostotic bone in the haemal spines and neural spines were absent.

The dorsal pterygiophore was located in the top third part of the neural spine. The sizes and shapes of them varied as irregular-spherical and spherical elongated, for the 1$^{st}$, 2$^{nd}$ and 3$^{th}$ of dorsal pterygiophore respectively. The largest pterygiophore was the 1$^{st}$ dorsal (22.33 mm in length and 15.03 mm in width) but the smallest pachyostotic bone was found in the 3$^{rd}$ dorsal (6.81 mm in length and 6.21 mm in width). The postcleithrum was located in the first third of the dorsal with spindle-shaped. The rib size was 33.19 mm in length and 10.63 mm in width.

## Discussion and Conclusion

This research was the first report of pachyostotic bone in the Narrow-barred Spanish mackerel, *S. commerson* and, the African pompano, *A. ciliaris* that were collected from the coastal waters of the Gulf of Thailand. The deformity bones were present in the supraoccipital, dorsal pterygiophore, postcleithrum, neural and haemal spines. The deformity bones in neural spines were found in different the size, shape, and position.

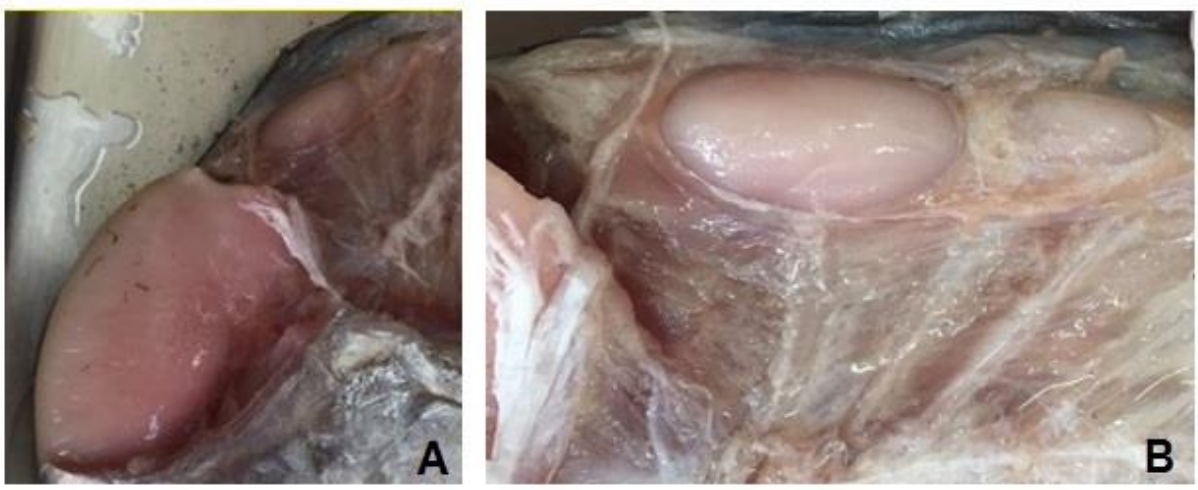


**Figure 2** *Alectis ciliaris* with the present of regions with pachyostotic bone.
A: Supraoccipital; B: Doral Pterygiophore

In *S. commerson*, the pachyostotic bones were found in both the neural spine and the heamal but the pachyostotic bones of *A. ciliaris,* were found in four regions; the supraoccipital area; the dorsal pterygiophore; the postcleithrum, and the ribs.

The etiologic factors of the deformed bones are still unknown. From the previous report, the diffuse skeletal osteoma was frequently investigated in bony fish and other animals such as mammals. In mammals, it found the deformed bones in Proboscidea, Hyracoidea, and Tubulidentata (i.e., dugong) which the axial skeleton was replaced completely by medullary bones (Bazzini *et al*., 1986). Moreover, skeletal deformities have also been reported in the form of mandibular swelling in dogs (Thornburg, 1979). Capasso Hypothesis (2005) said that the correlating fish size (total length and weight) and the number of pachyostosis bones to increase body weight. The opportunity of this reason to facilitate bottom browsing such as in the Sirenidae group acquired the high-density bone of the axial skeleton to consent browsing at the bottom in shallow waters. Although the bone neoplasm does represent the pathological condition, the individual disadvantage was largely compensated by the advantage of these groups. The pachyostotic bones increase the bone mass that is remarkably involved in the hydrostatic control of buoyancy, swimming abilities, and velocity (Houssaye, 2009; Houssaye *et al*., 2016; Bazzini *et al*.,1986, and capasso,2005).

Because of the few samples taken for this study, it is the lack of data to test for the moment to the confirmation deformity bone. Further study would be necessary to certify the previous hypothesis to fill the gaps in the morphological and histological data to understand the systematic distribution of the different types of deform bone.

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