

Osteology of paired fin elements of *Horabagrusbrachysoma* (Günther) population from northern Western Ghats of India

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Abstract

Family Horabagridae is peculiar among catfishes as it has been difficult to resolve the position of this family phylogenetically. This has been partly because of lack of detailed morphological data for members of this family. Here we describe osteology of pectoral and pelvic girdle of *Horabagrusbrachysoma* (Günther) based on cleared and counterstained specimens. This study will be important in resolving the position of family Horabagridae.

KEYWORDS: pectoral girdle, pelvic girdle, osteology, Horabagridae.

Introduction

Genus *Horabagrus* Jayaram, 1955 is an endemic catfish found only in west flowing rivers of Western Ghats of India. The genus currently comprises of two valid species *H. brachysoma* (Günther, 1864) and *H. nigricollaris* (Pethiyagoda&Kottelat, 1994), both of which are threatened (Dahanukar et al. 2011).

Horabagrusbrachysoma commonly called as sun catfish, yellow catfish or Günther's catfish was earlier considered to be endemic to the rivers and estuaries of Kerala and Karnataka but now it has extended till northern parts of Western Ghats (Katwate et. al. 2012). This species is characterized by following set of characters like moderately elongated and compressed body, anterior depressed large head, sub terminal transverse mouth, large inferior eyes which are visible from ventral surface of head, dorsal and pectoral fin having serrated spine with 5–7 and 8–9 branched rays, respectively; short adipose dorsal fin which is well separated from caudal fin base; ventral fin with i6 rays; long anal fin with iii23–iii28 rays, distinct brownish back dorsal side, sides pale yellow, white belly, a thick black shoulder spot and semilunar thick black ring at caudal base (Jayaram, 2006& 2010). Multiple stress factors like overexploitation, habitat alteration, pollution, and minimum population doubling time have resulted in population decline of *H. brachysoma* in its native occurrence ranges and as a result of which this species has been listed as Vulnerable in IUCN Redlist (Raghavaan and Ali, 2012).

Osteocranium and Weberian apparatus of *H. brachysoma* has been studied previously. Tilak (1965) has studied descriptive osteology of the fishes of family Bagridae. In the current paper we describe and illustrate the skeletal anatomy of this species from Malvan region, Maharashtra. These descriptions are primarily based on cleared and stained specimens.

Materials and methods:

Field surveys were conducted in Gad River basin of Sindhudurga District located in south Konkan region of Maharashtra. Gad River, one of the west flowing rivers in northern Western Ghats, lies between 16° to $16^{\circ} 20'$ N latitude and 73° $30'$ to 74° longitude. Specimens were collected in perennial second-order streams of Gad River near Bagayat village ($16^{\circ} 09' 04.35''$ N and $73^{\circ} 33' 04.7''$ E). Proper identification of the species using available taxonomic literature (Jayaram, 2009 & 2010) was carried out. Representative 05 specimens were collected for osteological study. The specimens were preserved in 4% formaldehyde for further study. Molecular identification of the same population has been confirmed using cox-1 and cyt- b gene sequences in earlier study (Katwate et al. 2012). Cleared and stained specimens were prepared following methods of Dingerkus and Uhler (1977). Dissections and osteological observations were made through Olympus SZX7 dissecting microscope.

Terminology

Osteological nomenclature has been followed as per Arratia, 2003.

Results and discussion:

Osteological observations were made on cleared and stained specimens (Fig 1).

Pectoral girdle and fin:

Pectoral girdle is triangular and broad in ventral view (Fig. 2A). It consists of paired posttemporo-supracleithra and cleithra, and a paired scapulo-coracoid plus mesocoracoid arch. Two proximal radials and a series of small cartilaginous distal radials are present. Cleithrum forms anterolateral part and scapulo-coracoid the medial and posterior parts of the girdle.

Scapulo-coracoid and the cleithrum meet forming ventral end of the girdle. Opposite halves of the girdle meet suture forming the ventral end of the girdle. Opposite ends of the girdle meet to form a median dentated suture.

Cleithrum is a well ossified and stout structure forming the majority of the girdle. It shows dorsal processes and a humeral process. Dorsal processes are upwardly directed and is distally bifid. The anterior dorsal process is slightly longer than posterior process. The anterior process articulates with posttemporo-supracleithrum. The humero- cubital process is well developed in *Horabagrus*. The cleithrum along with scapula- coracoid bears a deepmedial groove which bears the dorsal condyle of the pectoral spine.

The scapula- coracoid is an elongate,irregular bony structure joining the cleithrum along its lateral edge. Medially it joins it's another half to form a median dentated suture. Mesocoracoid is present as an arch joining the cleithrum and scapula- coracoid.

There are two separate rod like proximal radials which contact scapula- coracoid proximally. (Fig. 2B) Lateral to these proximal radials lie a trapezoidal cartilaginous complex radial (Mo, 1991).This complex radial helps in articulation of 8 fin rays. The

pectoral spine is a stout structure which articulates with scapula- coracoid and cleithrum. The inner and outer surface of pectoral spine bears numerous dentations.

Pelvic girdle and fin:

The pelvic girdle consists of flat basipterygia which are attached across their midline. (Fig .3) The posterolateral margin of basipterygium is cartilaginous where pelvic rays articulate. Each basipterygium bears anterior and lateral process. These processes are elongate and well ossified. Interior anterior process is slightly larger than external anterior process. Both external and internal anterior processes are distinct and well developed. The anterior ends of the inner anterior processes are united in the midline by connective tissue while in case of external anterior process they are well separated from each other. A moderately broad lateral process projects from lateral surface of basipterygium. Each pelvic fin is with 7 long fin rays. Fourth fin ray is longest while others go on becoming increasingly shorter laterally

This present work might help in resolving the position of *Horabagrusbrachysoma* in phylogenetic context.

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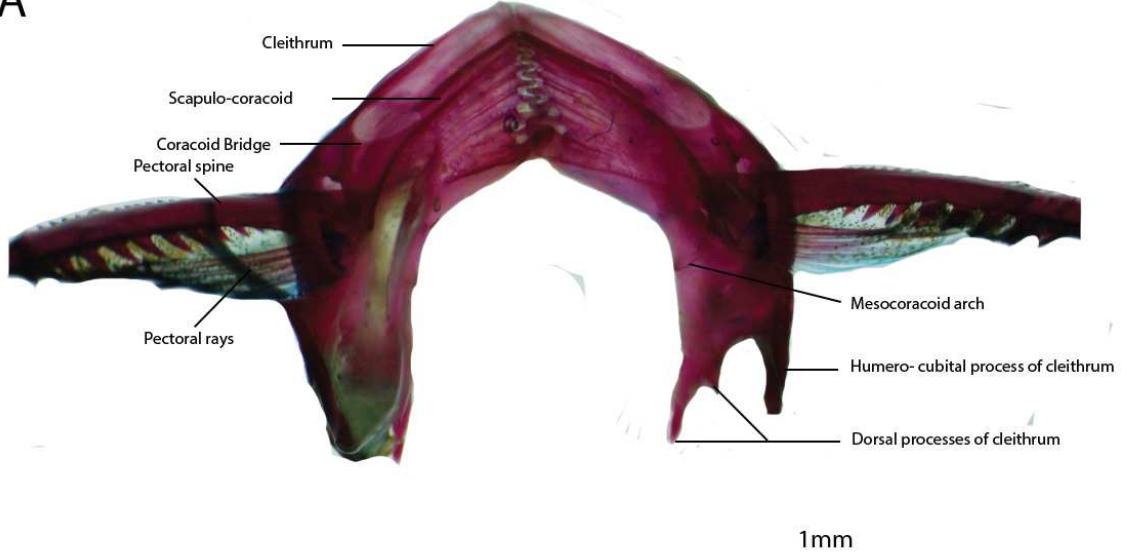
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Fig.1:*Horabagrusbrachysoma* cleared and stained specimen.



Fig. 2: *H. brachysoma* pectoral girdle and fins in ventral view.

A



B

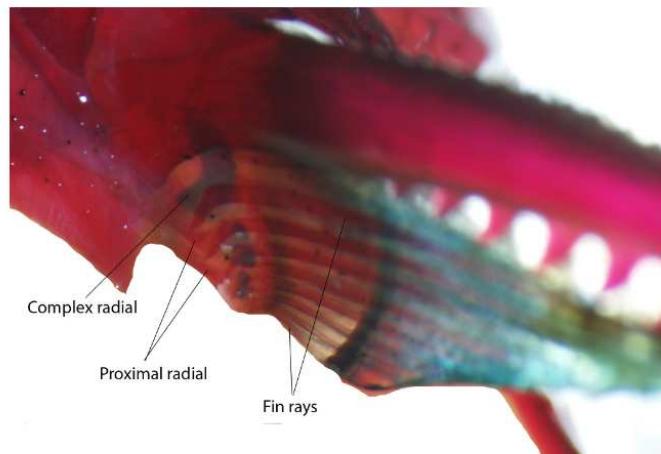


Fig. 3:*H. brachysoma* pelvic girdle and fins.

