

TELEOSTEANS (BONY FISHES) IN THE BOKA BIL FORMATION OF TRIPURA STATE, INDIA

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ABSTRACT

The paper gives the systematic description of teleost (bony) fishes in the Intra-formational Conglomerate of Boka Bil Formation of Surma Group exposed near Hawabari in Baramura Range of West district Tripura. The fish teeth have been identified as *Sjarus cinctus*, *Sparnodus helvecianus* and *Cybium* sp. *Sparnodus helvecianus* is the first report from the Indian sub-continent and is known to occur in the Miocene strata of Portugal. These fish genera, living in marine shallow to slightly deeper waters are suggestive of Burdigalian-Helvetian age for the beds containing them.

INTRODUCTION

The paper records, for the first time, the occurrence of isolated teeth of teleost (bony) fishes in the Intra-formational conglomerate of the Boka Bil Formation of Surma Group exposed near Hawabari in Baramura Range of West district, Tripura. (Fig. 1)

In Tripura state, lithostratigraphic units classified as Surma Group (the basal Bhuban Formation and the upper Boka Bil Formation), the silicified fossil wood bearing sandstone designated as Tipam sandstone Group and the mottled sand/clay horizon placed under the Dupi Tila Formation are exposed in the longitudinal hill ranges.

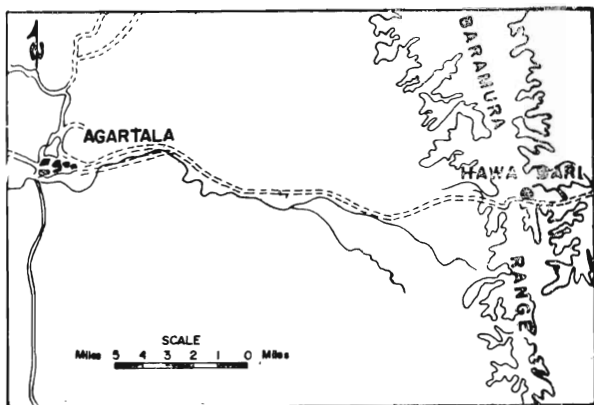


Fig. 1. Sketch Map of North Tripura showing teleostean fish locality

The Boka Bils in the Baramura range consist of huge thickness of silt, shale, fine sand alternations and occas-

ional lenticular bands of fossiliferous conglomerate (Intraformational conglomerate).

PREVIOUS WORK

The occurrence of fossil fishes in the Boka Bil Formation (Surma Group) is known since 1938 when a collection of fossils from the Jampui Range, Tripura by K. L. Das (1938, see Vachell, 1942) was identified by Eames in which he recorded the shark genera *Carcharias* (*Prionodon*) *gangeticus* and *Carcharodon megalodon*. Trivedy (1966, 1980) reported the presence of a number of fish teeth along with other vertebrate fossils from the Intra-formational conglomerate of the Boka Bils, North Tripura. He identified the fish teeth as *Oxyrhina spallanzani*, *Oxyrhina* sp., *Oxyrhina* cf. *pagoda*, *Prionodon gangeticus* and unidentifiable siluroid and assigned Upper Aquitanian to Lower Helvetian age to the Boka Bil Formation. Das Gupta (1984) and Basu and Das Gupta (1976) collected a few fish teeth belonging to *Carcharias gangeticus* and *Isurus spallanzani* along with other mammalian fossil from the conglomerate of Kumarghat area and assigned an age not older than Upper Miocene.

But significantly, none of the above records mentioned about the occurrence of any specific teleostean fish.

PALAEOONTOLOGY

The samples of Intra-formational conglomerate collected by one of the authors (NKS) from the Boka Bil shales exposed near Hawabari in Baramura Range of West Tripura were processed for their microvertebrate content. During the course of study isolated teeth

belonging to teleosteans (bony fishes) were recovered and identified as following :

Sparus cinctus Agassiz.
Sparnodus helvecianus Jonet
 and *Cybium* sp.

SYSTEMATIC DESCRIPTION

Class Osteichthyes
 Subclass Actinopterygie
 Superorder Percoidei
 Family Sparidae
 Genus *Sparus* LINNÉ 1985

(Syn. *Chrysophyrus* CUVIER, 1829
Sparus cinctus Agassiz, 1839

(Plate I—B, D)

Material : Isolated teeth, GSI Type No. 20057
 (Canine tooth) (Intermediate tooth)

Description : The canine tooth is strong large and cylindroconical tooth separated into 2 parts by a pronounced furrow. The basal portion is high, thick and circular and the apical one is less high, narrower with a rounded apex. The apex is slightly inclined toward the inner margin. The outer margin is little convex. In the basal circular section a central cavity is seen.

The crown of intermediate tooth is of cylindroconical shape and divisible into two parts. The basal part is high, thick and circular, while the shining apical part is less high, narrower with a flattened apex. The pronounced furrow separating the basal and apical portion is absent. Basal section is circular with thick wall and small pulp cavity.

Remarks : The intermediate tooth has been found similar to *Sparus cinctus* described by Antunnes *et al.* (1981, pl. IV, fig. 25) from the Lower Miocene beds of Algarave coast in Portugal, while the canine shows similarity with *Sparus cinctus* described by Jonet (1975, Pl. II fig. 1) from the Lower Miocene beds of Caparica coast in Portugal and by Mehrotra (1980, pl. 1, fig. 8) from the Lower Miocene beds of Baripada, Orissa.

Genus *Sparnodus* AGASSIZ., 1839
Sparnodus helvecianus JONET, 1975

(Plate I—A)

Material : Isolated tooth; G. S. I. Type No. 20058

Description : Massive elongated tooth divisible into 2 parts. The basal portion is coarse, thick and of equal height to that of apical portion. The basal section presents a pulp cavity equal to one-third of the total diameter. The cavity is surrounded by thick wall. In the apical portion the inner margin is slightly concave,

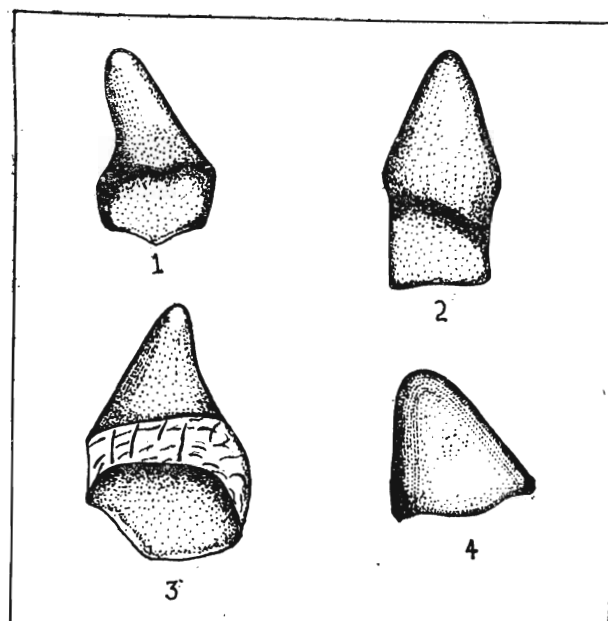


Fig. 2. Schematic Drawing of fish Teeth

1. *Sparnodus helvecianus*
2. *Cybium* sp.
3. *Sparus cinctus*-Canine
4. *Sparus cinctus*-Intermediate.

while the outer margin is convex forming a pointed crest of translucent enamel. The apical portion is devoid of any surface ornamentation, while the basal portion shows coarse pits.

Remarks : The present specimen shows close resemblance with *S. helvecianus* described by Jonet (1975; pl. II, fig. 50) from the Lower Miocene beds of Caparica coast of Portugal.

Suborder Scombroidea
 Family Scombridae
 Genus *Cybium* CUVIER, 1829

Cybium sp.

(Plate I—C)

Material : Isolated tooth ; GSI type No. 20059

Description : The tooth is large and laterally compressed. The basal part is cylindrical, while the apical part is of arrow head shape. The lateral edges of the crown are sharp and without serrations (Probably the serrations are worn out). Although on one side the basal part of the crown is incomplete, the reconstruction of the same suggest that the basal section may be of plano-convex shape. The surface of the crown is smooth without pulp cavity.

Measurements in MM.:

Name of the species	Specimens	Height of crown	Width of crown
<i>Sparus cinctus</i>	No. 20057	0.9	0.5
<i>Sparnodus helvecians</i>	20058	0.25	0.2
<i>Cybium</i> sp.	20059	0.45	0.2

Remarks : The present specimen resembles to some extent *C. angustidens* described from the Eocene of Africa (White, 1926) but in *C. angustidens* the parallel lateral edges curve sharply towards the apex, while in the present specimen the edges take a symmetrical turn forming an equilateral triangle. The present specimen also resembles *Cybium* sp. described from the Lower Miocene beds of Kutch (Sahni & Mishra, 1975) and the Quilon beds (Lower Miocene) beds of Kerala coast (Mehrotra, 1982) in having sharp cutting edges but differs in the absence of serrations. It also differs in its smooth surface of the crown in contrast to above discussed species of *Cybium* which have longitudinal striations on their crown surface.

DISCUSSION

A review of the fossils reported, so far from the Intraformational conglomerate of the Boka Bil Formation, Tripura reveals that both the mammalian and reptilian fossils are found in association with marine fishes and bivalves.

The mammalian fauna comprising *Dorcatherium Trilophodon angustidens* (Trivedy, 1966), *Gomphotherium* cf. *angustidens*, *Pachyportax nagrii* (Basu and Das Gupta, 1976) and *Stegolophodon cauteleyi*, *Hipparion theoboldi*, *Propotamochoerus hysudricus* (Pandey, 1965-66 in Sinha, 1975) suggest that the age of the Intraformational conglomerate horizon should not be regarded older than Tortonian i.e. Upper Miocene. Although Trivedy (1980) on the basis of recent find of *Gomphotherium angustidens* from the conglomerate horizon, has assigned its age as Upper Aquitanian-Lower Helvetian considering *G. angustidens* as a link form between *G. cooperi* (Lower Miocene) and *G. palaeindicus* (Mid. Miocene-Lower Pliocene).

Of the marine elements, the cartilaginous fishes represented by *Carcharias (Prionodon) gangeticus*, *Isurus spallanzani* (Basu and Das Gupta, 1976; Trivedy, 1966 & 1980) are the characteristic forms recorded from the Pyabo stage (Lower Miocene) of Burma (Noetling, 1901; Stuart, 1910) and coastal Lower Miocene sediments of Indian subcontinent (Mehrotra, 1981). Similarly the bony fishes, as reported in the present paper have been earlier reported from the Lower Miocene beds of Portugal

(Antunes *et al.*, 1981 and coastal Lower Miocene sediments of India (Mehrotra, 1981 & 1982), especially the *Sparnodus helvecianus* which has nowhere been recorded from the beds younger than Middle Miocene.

Hence, on the basis of present find of teleostean (bony) fishes the age of conglomerate horizon may be considered as Burdigalian-Helvetian (Lower to Middle Miocene) which corroborates with the age of the conglomerate band ranging from upper Aquitanian-Lower Helvetian as suggested by Trivedy (1980).

Further, the age of the underlying Bhuban Formation is regarded as Lower Miocene (Aquitanian while the overlying Tipam Group as Upper Miocene.

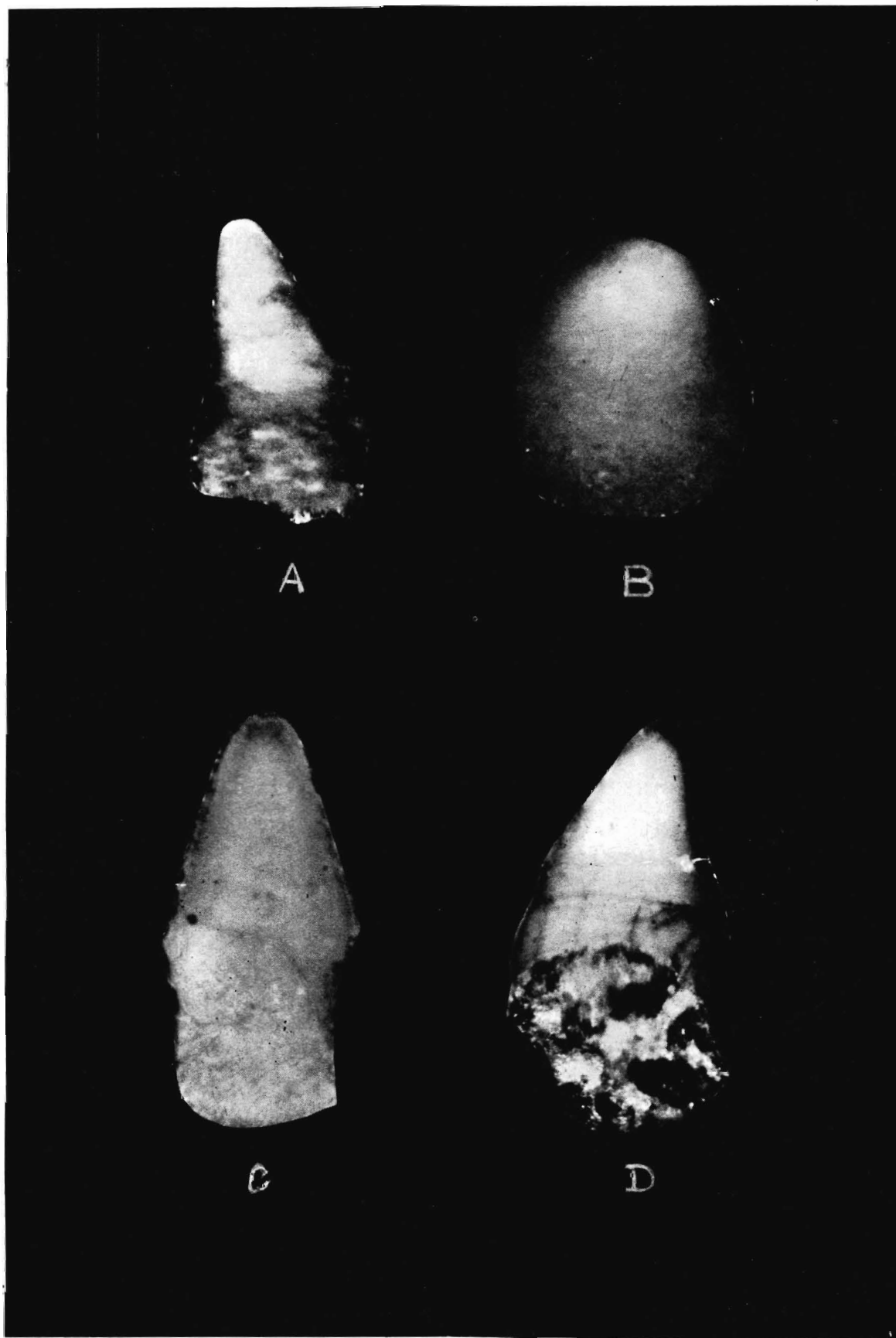
The overall composition of vertebrate fauna of conglomerate bed points to the prevalence of oxygen rich environment and warm shallow coastal water conditions. As the animal remains in the conglomerate bed are not uniformly distributed but found in heaps of certain pockets, it may be inferred that the conglomerate was deposited due to sudden transport of debris by rapid wave action. The prevalent high energy environment near the coast must have been responsible for the intermixing of two different types of faunal elements living near the shore.

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EXPLANATION OF PLATE

PLATE I

- A. *Sparnodus helvecianus* Jonet $\times 180$
B. *Sparus cinctus* Agassiz (Intermediate tooth) $\times 190$
C. *Cybiium* sp. $\times 160$
D. *Sparus cinctus* Agassiz (Canine tooth) $\times 90$