

A new selachian fauna from the Eutaw Formation (Upper Cretaceous/Early to Middle Santonian) of Chattahoochee County, Georgia

by

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with 6 plates and 6 text-figures

Zusammenfassung

Eine vor kurzem im Chattahoochee County in Georgia (Vereinigte Staaten von Amerika) entdeckte Selachierfauna wird beschrieben. Die Autoren stellen eine Vergesellschaftung von Haihäufchen aus einer fossilen Austerbank aus dem unteren Member der Eutaw Formation vor.

Folgende neue Taxa werden beschrieben: *Pseudohypolophus ellipsis* nov. sp., *Microdontaspis tenuis* nov. gen., nov. sp., *Columbusia fragilis* nov. gen., nov. sp., *Erguitaia benningensis* nov. sp., *Erguitaia rugosa* nov. sp., *Ptychotrygon chattahoocheensis* nov. sp., *Ptychotrygon eutawensis* nov. sp., *Ptychotrygon nebulosus* nov. sp., *Ischyrrhiza georgiensis* nov. sp., und *Borodinopristis ackermanni* nov. sp.

Zusätzlich wurden noch folgende Formen erkannt: *Hybodus* sp., *Ptychodus mortoni* MANTELL, *Lissodus babulskii* (CAPPETTA & CASE), *Protolatyrhina renae* CASE, *Squatina hassei* LERICHE, *Chiloscyllium* sp., *Squalicorax falcatus* (AGASSIZ), *Cretolamna appendiculata* AGASSIZ, *Cretodus* cf. *borodini* (CAPPETTA & CASE), *Scapanorhynchus raphiodon* AGASSIZ, *Ptychotrygon* cf. *triangularis* (REUSS), *Ptychotrygon* sp., und *Ischyrrhiza mira* LEIDY.

Erguitaia war bisher nur aus Marokko bekannt. Nunmehr kennen wir zwei Arten aus Nordamerika.

Der neue Name *Columbusia* hat Vorrang über den Gattungsnamen *Squatirhina* (CASE, 1987). Die restlichen Arten sind in der Kreide kosmopolitisch.

Schlüsselwörter: Selachier – Kreide – Georgia – U.S.A.

Abstract

A recently discovered selachian fauna is presently described from Chattahoochee County, Georgia in the United States of America.

The authors are presenting a faunal assemblage of selachians found in an ancient oyster bed in the lower member of the Eutaw Formation.

The following new taxa are described: *Pseudohypolophus ellipsis* nov. sp., *Microdontaspis tenuis* nov. gen., nov. sp., *Columbusia fragilis* nov. gen., nov. sp., *Erguitaia benningensis* nov. sp., *Erguitaia rugosa* nov. sp., *Ptychotrygon chattahoocheensis* nov. sp., *Ptychotrygon eutawensis* nov. sp., *Ischyrrhiza georgiensis* nov. sp., and *Borodinopristis ackermanni* nov. sp.

Additional fauna recovered are as follows: *Hybodus* sp., *Ptychodus mortoni* MANTELL, *Lissodus babulskii* (CAPPETTA & CASE), *Protolatyrhina renae* CASE, *Squatina hassei* LERICHE, *Chiloscyllium* sp., *Squalicorax falcatus* (AGASSIZ), *Cretolamna appendiculata* AGASSIZ, *Cretodus* cf. *borodini* (CAPPETTA & CASE), *Scapanorhynchus raphiodon* AGASSIZ, *Ptychotrygon* cf. *triangularis* (REUSS), *Ptychotrygon* sp., and *Ischyrrhiza mira* LEIDY.

Erguitaia has previously been known only from Morocco. We now have two new species from North America.

The new genus *Columbusia* takes precedence over the generic name *Squatirhina* (CASE, 1987). The remainder of the specimens are cosmopolitan to the Cretaceous.

Key words: Selachians – Cretaceous – Georgia – U.S.A.

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Contents

1. Introduction	84	<i>Cretolamna</i>	91
2. Location, geology and age of the assemblage	84	<i>Squalicorax</i>	92
3. Systematics.....	86	<i>Pseudohypolophus</i>	92
<i>Hybodus</i>	86	<i>Protoplatyrhina</i>	92
<i>Lissodus</i>	87	<i>Borodinopristis</i>	93
<i>Ptychodus</i>	87	<i>Ischyrhiza</i>	94
<i>Squatina</i>	88	<i>Erguitaia</i>	94
<i>Chiloscyllium</i>	88	<i>Ptychotrygon</i>	95
<i>Columbusia</i> nov. gen.	89	4. Summary and conclusions	97
<i>Microdontaspis</i> nov. gen.	90	Acknowledgements	97
<i>Scapanorhynchus</i>	91	References	98
<i>Cretodus</i>	91	Explanation of plates	99

1. Introduction

An investigation of the Upper Cretaceous (Early to Middle Santonian) geological formations of the Fort Benning area, near the town of Columbus, Georgia has yielded a diverse fauna of Selachians. This fauna is comprised of 11 shark species, and 6 batoids (skates, rays, and sawfishes).

This fauna was found in association with oyster shells indicating that this was a near shore paleoenvironment. Scientists who have studied the invertebrates have determined that the age of the deposit is Early to Middle Santonian which concurs with the present authors placing of the Selachian material as of the same age.

2. Location, geology and age of the assemblage

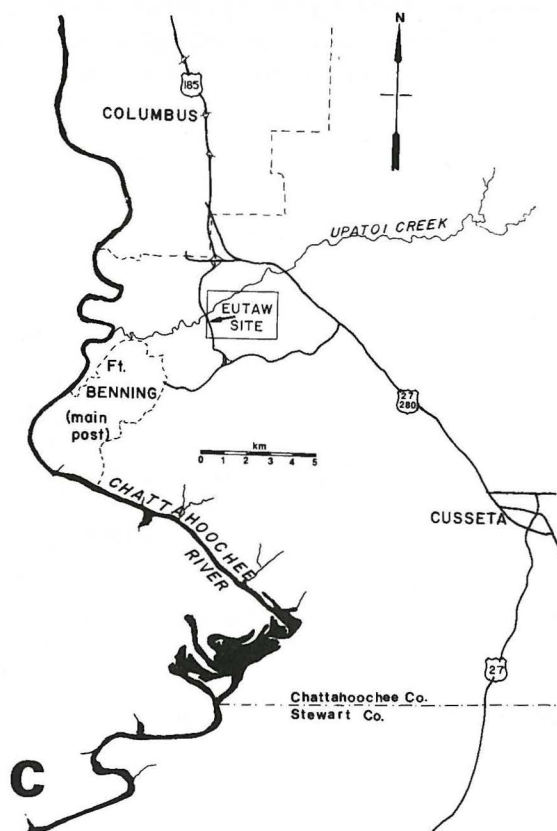
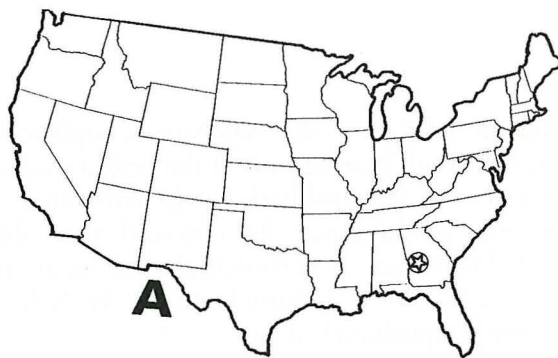
Location

The primary collecting site is within Fort Benning Military Reservation in Chattahoochee County, Georgia. This is an exposure of nearly the entire Eutaw Formation, along approximately 300 m on the east side of Interstate Highway 185, adjacent to the south bank of Upatoi Creek (Text-fig. 1). This site had undergone landsliding during construction of the Interstate highway (MARSALIS & FRIDDELL 1975), and continuing erosional exposure has yielded thousands of selachian teeth and other fossils. The most productive vertebrate fossil horizons are low in the formation, from the approximate lower third to the middle of the unit. Other regional localities of the Eutaw Formation have been sampled for this study, including outcrops within 2.5 km proximity along U.S. Highway 27, both to the east and west of the primary site, from approximately the same stratigraphic horizon and lithofacies (as discussed below).

Geology

The Eutaw Formation is a generally thin unit that represents the first Late Cretaceous marine transgression across the eastern Gulf of Mexico Coastal Plain. It is recognized westward to northeastern Mississippi (STEPHENSON & MONROE 1940) and Tennessee, and eastward into west-central Georgia (EARGLE 1955, REINHARDT 1981, 1986). The reference section is in Eutaw, Greene County, western Alabama, where the formation features a massive, glauconitic, fossiliferous sandstone upper member (the Tombigbee) and an unnamed, generally more argillaceous lower member. The Eutaw Formation disconformably overlies the fluvially-deposited Tuscaloosa Sandstone over its entire geographic extent, and grades upward, usually conformably, into variously-named marine units across its outcrop.

In the western Georgia study area of this report, the Eutaw Formation is lithologically more complex and diverse than in the more westerly referenced region. It is no more than 45 m thick (EARGLE 1955) in the thickest local exposures on both sides (Alabama and Georgia) of the Chattahoochee River Valley; yet, it contains a wide variety of lithofacies (FRAZIER & TAYLOR 1980, FRAZIER 1982). These variable lithologies reflect a range of nearshore and paralic marine paleoenvironments developed in and around a series of barrier island systems,



Text-fig. 1. A. Map of the United States with the fossil locality shown by a star in a circle. B. Close-up of the locality showing one of the authors (PDB) standing on the outcropping where fossil vertebrates and oyster shells are found. C. Map showing detail of the fossil locality and nearby Upatoi Creek and towns.

including: relatively clean sandstones; argillaceous, marly, sandstones; and sandy, marly mudstones. The vertebrate-tooth bearing beds at the primary collecting site are mostly argillaceous, marly sandstones deposited in marshy and lagoonal back-barrier environments of deposition. Given this inferred nearshore paleoenvironment, one would expect the observed great abundances and diversity of Batoidea and typically nearshore neoselachians (such as *Scapanorhynchus*, *Squalicorax*, and *Cretolamna*) in the preserved selachian assemblage.

"The locality is at latitude 32° 22' 55" N by longitude 84° 55' 40" on the Columbus Georgia USGS 7.5' topographic quadrangle map."

Age

In the reference area in western Alabama and most of its western exposures, the Eutaw Formation was deposited throughout the Santonian Epoch, with the uppermost Tombigbee Member ranging into the base of the Campanian. However, in the west Georgia study area of this report, the formation is overall slightly older. In eastern Alabama and Georgia the Tombigbee Member is neither distinguishable nor recognized (REINHARDT 1981, 1986), and the entire formation lies well below the Santonian-Campanian boundary. The unit ranges there from the middle Turonian into the late Santonian (SOHL & SMITH 1981, CHRISTOPHER 1982), based on molluscan and nannofossil biostratigraphy. The overlying Blufftown Formation ranges stratigraphically down to the latest Santonian up through the middle Campanian (CASE & SCHWIMMER 1988, SCHWIMMER et al. 1993). The fossils collected for this study are from the primary site along Interstate 185, from the lower third to the middle of the Eutaw Formation, and are probably of early to early-middle Santonian age. Selachian fossils from other regional Eutaw Formation sites may range into the early-late Santonian.

Prior study

Prior study of the paleontology of the Eutaw Formation in the eastern Gulf Coastal Plain has been very limited. STEPHENSON (1957) described molluscan taxa, including several new species from localities within the Fort Benning, Georgia, close to the present study area. SCHWIMMER et al. (1985) described the first known occurrence of pterosaurs in Georgia within the marly mudstone facies of the Eutaw Formation in Fort Benning, from a locality approximately 7 km from the present study area. SCHWIMMER & CASE (1986) included a preliminary report on the fish fauna from several localities in western Georgia, from the Eutaw Formation including the primary site considered here. SCHWIMMER et al. (in review, 1996) noted the occurrence of the large ichthyodectid teleost *Xiphactinus audax* in the Eutaw Formation in eastern Alabama; and a forthcoming report on the overall osteichthyan assemblage of the Eutaw Formation in Georgia (SCHWIMMER, in prep.) will include descriptions of several pycnodonts and teleosts, an aspidorhynchomorph, and a coelacanth.

3. Systematics

In this part, the classification followed is that of CAPPETTA, 1987.

Class Chondrichthyes

Subclass Elasmobranchii

Cohort Euselachi

Superfamily Hybodontoidea

Family Hybodontidae OWEN 1846

Genus *Hybodus* AGASSIZ 1837

Hybodus sp.

(Plate 1, Fig. 1-7)

Material: Three tooth specimens, all lateral (incomplete), and a partial dorsal fin spine.

Specimens: (CSUK97-2-1), Plate 1, Fig. 1-2, (CSUK97-2-65), Plate 1, Fig. 3, (CSUK97-2-66), Plate 1, Fig. 4, (CSUK97-2-2), Plate 1, Fig. 5-7.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: The teeth are small, averaging 1 to 2 cm in width. Unfortunately the teeth are all incomplete (having lost their roots and lateral cusplets).

The dorsal fin spine (Plate 1, Fig. 5-7) is not complete either, but shows the typical barbs on the anterior edge of the specimen. This spine fragment measures 18 mm in its greatest length.

Discussion: The tooth specimens (Plate 1, Fig. 1-4) illustrate a rugose ornamentation on both the labial and lingual faces.

The dorsal fin spine is typical of a hybodont shark. At the present time it is impossible to assign this specimen to either a known species or a new species.

Family Polyacrodontidae GLIKMAN 1964

Genus *Lissodus* BROUGH 1935

Lissodus babulskii (CAPPETTA & CASE 1975a)

(Plate 1, Fig. 8-11)

1975a *Lonchidion babulskii* CAPPETTA & CASE, p. 6, Pl. 1, Fig. 3.

Material: Two incomplete lateral teeth.

Specimens: (CSUK97-2-33), Plate 1, Fig. 8 & 10, (CSUK97-2-47), Plate 1, Fig. 9 & 11.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Isolated lateral battery teeth, devoid of roots but otherwise showing little wear or postmortem ablation. Crowns show a "labial peg" in lingual view (Plate 1, Fig. 8), which in the jaw battery butts up against the labial aspect of the tooth in file.

Discussion: *Lissodus babulskii* was originally described in detail (as *Lonchidion*) by CAPPETTA & CASE (1975a) from the Early to Middle Maastrichtian of New Jersey. In 1985, in a documented study on the genus, DUFFIN relegated *Lonchidion* into synonymy with *Lissodus*.

This is the second occurrence of *Lissodus babulskii* in the State of Georgia, the Blufftown Formation being the first (CASE & SCHWIMMER 1988).

Family Ptychodontidae JAEKEL 1898

Genus *Ptychodus* AGASSIZ 1838

Ptychodus mortoni MANTELL

(Text-fig. 2)

Material: Two isolated teeth.

Specimens: (CSUK82-22-1) and (CSUK82-22-2).

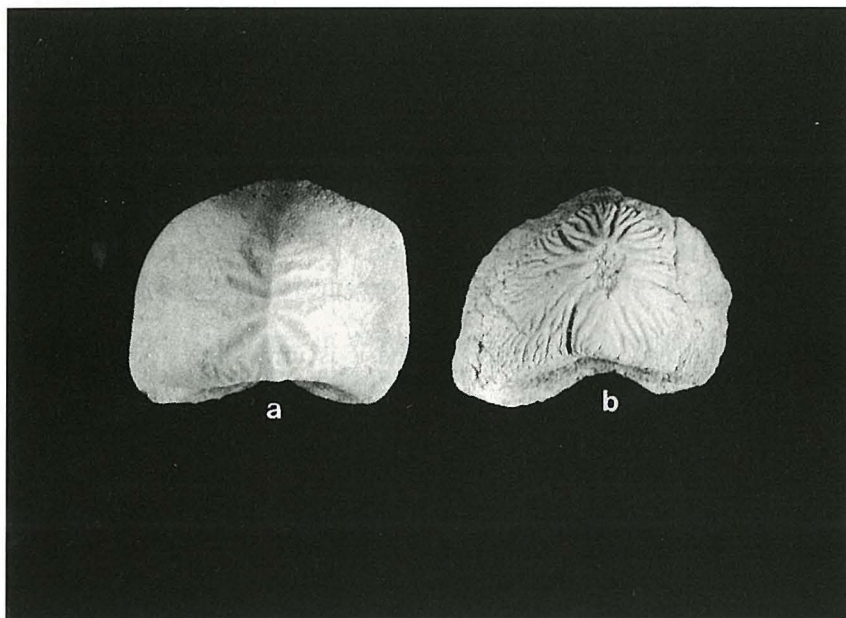
Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Teeth averaging less than 2 cm in their greatest width. Probably from the anterior or symphyseal region. The face of the teeth have radiating ornamentation (striae or transverse ridges) extending out into the marginal area of the tooth's crown. The root is not bi-lobed, it is a single platform (not shown in Text-fig. 2).

Discussion: Even though Text-fig. 2 does not show a lateral view, this species has a high crown. In order to see a crown in lateral view of this particular species refer to WELTON & FARISH (1993).

The presence of *Ptychodus mortoni* in this fauna strongly indicates a Santonian age. All *Ptychodus* species became extinct by the end of the Santonian.



Text-fig. 2. Anterior teeth of *Ptychodus mortoni* MANTELL. a. An occlusal view of a typical specimen. b. An occlusal view of an additional specimen.

Subcohort Neoselachii
Order Squatiniformes
Family Squatinidae BONAPARTE 1838
Genus *Squatina* DUMERIL 1906
Squatina hassei LERICHE
(Plate 1, Fig. 13-16)

1929 *Squatina hassei* LERICHE, p. 206, p. 207, Text-fig. 1-3.

1975a *Squatina hassei* LERICHE, CAPPETTA & CASE, p. 9, Pl. 1, Fig. 17-24.

Material: One lateral tooth.

Specimen: (CSUK97-2-71), Plate 1, Fig. 13-16.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Specimen measures 2 mm; contains no lateral cusps, instead has low shoulders; one on either side of the central blade. In profile view (Plate 1, Fig. 14), the central blade is inclined approximately 45 degrees. In basal view (Plate 1, Fig. 15), there is a foramina set close to the boss of the lingual edge of the tooth in basal aspect.

Discussion: This tooth is provisionally assigned to *Squatina hassei*. The apparent placement of the foramina near the boss of the lingual face gives us the impression that this tooth is more closely related to *Cretorectolobus* CASE (1978) than to *Squatina*.

Superorder Galeomorphii
Order Orectolobiformes
Family Hemiscyllidae GILL 1862
Genus *Chiloscyllium* MÜLLER & HENLE 1837

Chiloscyllium sp.

(Plate 1, Fig. 17-22)

Material: One lateral tooth.

Specimen: (CSUK97-2-70), Plate 1, Fig. 17-22.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: A small tooth measuring 3 mm at its greatest width. WELTON & FARISH (1993), state that "The crown (of *Chiloscyllium*) is smooth with one broadly triangular medium cusp; one pair of short, robust lateral cusplets."

In occlusal view (Plate 1, Fig. 17), the crown seems to have a coronal ridge extending to the apex of the crown and bordering on the central blade, extending to the cusplets. The basal view is not shown, but it does contain a root that is holaulacorhize.

Discussion: We cannot compare this specimen to *Chiloscyllium greeni* (CAPPETTA 1973) or to *C. greeni* in WELTON & FARISH (1993) because they show only anterior teeth of *C. greeni*. The tooth of the present study is a lateral tooth having some ornamentation on the labial face (Plate 1, Fig. 21), therefore we will have to assign this tooth to *Chiloscyllium* sp.

Family Orectolobidae GILL 1895

Columbusia nov. gen.

Type species: *Columbusia fragilis* nov. sp.

Derivatio nominis: Named after the town of Columbus, Georgia.

Diagnosis: Teeth of microscopic size, less than 2 mm in width and less than 1 mm in height, with an elongated root, and a lengthy central cusp continuing in a long apron extension in labial view, with no lateral shoulders to speak of, and finally (Text-fig. 3), a completely open basal root canal, separating the base into two distinct root lobes, a typical holaulacorhize condition.

Columbusia fragilis nov. gen., nov. sp.

(Plate 2, Fig. 32-36 and Text-fig. 3)

1987 *Squatirhina roessingi* CASE, p. 20, Pl. 7, Fig. 1 a-4 e.

Derivatio nominis: Species named for its diminutive and fragile appearance.

Holotype: (CSUK97-2-48), Plate 2, Fig. 32-34, and Text-fig. 3.

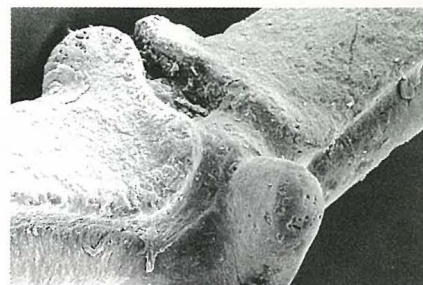
Paratype: (CSUK97-2-61), Plate 2, Fig. 35-36.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Same as for the genus.

Description: Minute teeth averaging 2 mm in their greatest width. In labial aspect (Plate 2, Fig. 33) the central cusp of the tooth extends downward over the root forming a cruciform shape over the entire tooth, which in reality is caused by the apron extension. There are no ornamented shoulders on *Columbusia* as is evident in



Text-fig. 3. *Columbusia fragilis* nov. gen. and nov. sp. Holotype. A basal view showing furrow traversing the entire width of the tooth.

C. (Squatirhina) roessingi (CASE 1987, Pl. 7, Fig. 1d and 1g). The basal view of *Columbusia* is identical to the basal view of the tooth described by the senior author (GRC) (CASE 1987). In basal aspect the median furrow extends the entire vertical width of the base, from the lingual to labial aspects, thus being holaulacorhize in structure.

Discussion: WERNER (1989, 71) erected a genus from the Baharija Oasis in Egypt (Upper Cenomanian) as *Sechmetia*. WERNER, in her paper considered that *Sechmetia* is similar in some respects (i. e.; the cruciform crown structure) to CASE's *Squatirhina roessingi*. As a disclaimer to the above, WERNER further states on her page 72 (WERNER 1989), that "However, these teeth (*Squatirhina roessingi*), in CASE (1987) are different from her new genus *Sechmetia* by protruding, long and slender, and not broadly convex restricted median part of the lingual view."

What WERNER has done is to bring to the attention of the senior author (GRC) of this present paper, that his choice of the genus *Squatirhina* was in error. The authors of this present paper see the similarities of their new genus, *Columbusia* to CASE's *Squatirhina*, therefore *Squatirhina roessingi* should now be known as *Columbusia roessingi* (CASE).

Microdontaspis nov. gen.

Type species: *Microdontaspis tenuis* nov. gen., nov. sp.

Derivatio nominis: *Micro* = tiny, and *Odontaspis*.

Diagnosis: Extremely small teeth, anterior, lateral and posterior of an early sandshark.

Microdontaspis tenuis nov. gen. and nov. sp.

(Plate 4, Fig. 69-70, 73-74, 83-89 and Text-fig. 4)

Material: 7 teeth, anterior, antero-lateral, lateral and posterior.

Derivatio nominis: Named for their thin appearance (especially the anterior teeth).

Holotype: (CSUK97-2-8), Plate 4, Fig. 85-87.

Paratypes: (CSUK97-2-75), Plate 4, Fig. 83-84, (CSUK97-2-76), Plate 4, Fig. 88-89, (CSUK97-2-77), Plate 4, Fig. 69-70, (CSUK97-2-9), Plate 4, Fig. 73-74, (CSUK97-2-69), Text-fig. 4a, and (CSUK97-2-78), Text-fig. 4b.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: See the genus diagnosis.

Description: Tiny teeth with the following features: anterior teeth with a single slender and lengthy side cusp, one on either side of the central blade (Plate 4, Fig. 85-87); in the case of lateral teeth, the side cusps become more spade-like, often with a vestigial cusplet associated with it (Plate 4, Fig. 83, 84, 88 and 89); the side cusps of



Text-fig. 4. *Microdontaspis tenuis* nov. gen. and nov. sp. Paratype. a. and b. Two examples of posterior teeth.

the posterior teeth become broader and almost "shoulder-like", leaning toward the commissure (Text-fig. a and b, a. being an incomplete tooth-missing a lateral cusp). On some teeth, notably the anterior type, there is evidence of faint striae in lingual aspect (Plate 4, Fig. 69 and 73). There are shortened rugose striae at the base of the root apron where it meets the enamel of the tooth on the lateral specimens in labial aspect (Plate 4, Fig. 84 and 89). On each of the anterior, lateral and posterior teeth, there exists a nutritive groove in lingual aspect that cuts across the entire root separating the root into two distinct lobes (Plate 4, Fig. 69, 83, 87, and Text-fig. 4a).

Discussion: The present authors believe that these specimens represent the earliest occurrence for a "sand-shark" in the fossil record. The fact that these teeth are so tiny and thin, especially the anterior teeth, separates *Microdontaspis tenuis* from all other odontaspids.

Family Mitsukurinidae JORDAN 1898

Scapanorhynchus WOODWARD 1889

Scapanorhynchus raphiodon (AGASSIZ)

(Plate 4, Fig. 65-68, 71-72, 75-82)

Material: Four anterior, and three lateral teeth.

Specimens: (CSUK97-2-27), Pl. 4, Fig. 65-66, (CSUK97-2-30), Pl. 4, Fig. 67-68, (CSUK97-2-28), Pl. 4, Fig. 71-72, (CSUK97-2-29), Pl. 4, Fig. 75-76, (CSUK97-2-7), Pl. 4, Fig. 77-78, (CSUK97-2-31), Pl. 4, Fig. 79-80, and (CSUK97-2-26), Pl. 4, Fig. 81-82.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Typical specimens averaging 1 to 4 cm in height, anterior teeth devoid of lateral cusps, and lateral teeth with spade-like side cusps. All teeth possess a pronounced nutritive groove and the anterior teeth alone exhibit strong striae in lingual aspect (Plate 4, Fig. 66).

Discussion: The teeth of *Scapanorhynchus raphiodon* are similar in many respects to those of *S. texanus*. For a good comparison of both species, see WELTON & FARISH (1993).

S. raphiodon is typical of the mitsukurinid sharks found in most formations from the Turonian down to Late Santonian. They are replaced by *S. texanus* from the Early Campanian through the Middle Maastrichtian of the Upper Cretaceous.

Family Cretoxyrhinidae GLIKMAN 1958

Cretolamna appendiculata AGASSIZ

(Plate 3, Fig. 49-58)

Material: Five teeth, 1 anterior, 3 lateral, and 1 latero-posterior.

Specimens: (CSUK97-2-22), Plate 3, Fig. 49-50, (CSUK97-2-25), Plate 3, Fig. 51-52, (CSUK97-2-24), Plate 3, Fig. 53-54, (CSUK97-2-21), Plate 3, Fig. 55-56, and (CSUK97-2-20), Plate 3, Fig. 57-58.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Teeth averaging 1 to 2 cm in height. Anterior teeth have a triangular side cusp one on either side of the central blade. No nutritive groove is evident on any of the specimens. Lateral teeth become more broad and flat with side cusps that more or less hug the root apron and do not rise far from where the enamel meets the root. Postero-lateral teeth (Plate 3, Fig. 49-50) show a very broad side cusp, one on either side of the central blade.

Discussion: For a fuller description of this species, see CAPPETTA & CASE (1975a).

Cretodus borodini (CAPPETTA & CASE)

(Plate 3, Fig. 59-64)

Material: Two anterior teeth (both specimens slightly damaged).

Specimens: (CSUK97-2-4), Plate 3, Fig. 59-61, and (CSUK97-2-14), Plate 3, Fig. 62-64.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Teeth of small size averaging 1.5 to 2.5 cm in height, with a strong rugose striae on the enamel apron in labial view (Plate 3, Fig. 61 and 62). The root is robust and devoid of a nutritive groove. A large spade-like side cusp exists, one on either side of the central blade.

Discussion: *Cretodus borodini* was first described by CAPPETTA & CASE (1975a) as *Plicatolamna borodini*. The two specimens in this report are slightly damaged, but they show the general characteristics of *C. borodini*.

Family Anacoracidae CASIER 1947

Squalicorax WHITLEY 1939

Squalicorax falcatus (AGASSIZ)

(Plate 3, Fig. 43-48)

Material: Three teeth, 1 anterior, 1 antero-lateral, and 1 lateral.

Specimens: (CSUK97-2-17), Plate 3, Fig. 43-44, (CSUK97-2-18), Plate 3, Fig. 45-46, and (CSUK97-2-19), Plate 3, Fig. 47-48.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Teeth averaging 2 cm in height. Anterior teeth (Plate 3, Fig. 43) are more erect than lateral varieties and have a pronounced shoulder as opposed to a side cusp. The entire edge of the enamelled portion of the teeth are serrated, including the shoulder. No nutritive groove exists.

Discussion: The teeth of *Squalicorax falcatus* are similar in many respects to *S. kaupi*, but with a more oblong central blade. A good comparison of both these species can be found in WELTON & FARISH (1993). The species *S. falcatus* is replaced by *S. kaupi* beginning in the Campanian stage and ends in the Middle Maastrichtian stage of the Upper Cretaceous.

Superorder Batomorphii

Order Rajiformes

Rhinobatoidei incertae sedis

Genus *Pseudohypolophus* CAPPETTA & CASE 1975

Pseudohypolophus ellipsis nov. sp.

(Plate 2, Fig. 37-42)

Material: 1 specimen, a lateral tooth.

Holotype: (CSUK97-2-13), Plate 2, Fig. 37-42.

Derivatio nominis: Named for its elliptical shape.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: The specimen is large, approximately 1 cm in its overall width, its shape is elliptical, the basal aspect has a holaulacorhize condition.

Description: The specimen in comparison to *Pseudohypolophus mcnultyi* (THURMOND), which was 5 mm in width on the average and is considerably larger. *P. mcnultyi* is rhomboid in its shape (oral view) whereas *P. ellipsis* nov. sp. is elliptical in its shape (oral view) (Plate 2, Fig. 40).

Discussion: CAPPETTA & CASE (1975a) redescribed the genus *Hypolophus* as *Pseudohypolophus*. The type specimen was *P. mcnultyi* THURMOND. One of the present authors (JLL) has recovered a specimen of *Pseudohypolophus* from the Middle Maastrichtian of New Jersey, which has yet to be described.

Family Hypsobatidae CAPPETTA 1992

Genus *Protoplatyrhina* CASE 1978

Protoplatyrhina renae CASE

(Plate 1, Fig. 12)

Material: 1 specimen, an anterior tooth.

Specimen: (CSUK97-2-59), Plate 1, Fig. 12.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: A batoid tooth, 1 mm in length, and 0.75 mm in its height, without a lingual protuberance on the apron of the crown; with a medial furrow in the center of the basal aspect (not shown).

Discussion: This species is turning up in many Upper Cretaceous localities in North America (New Jersey, Delaware, Texas, Wyoming, Montana, and now Georgia). CASE (1978) originally described *Protoplatyrhina renae* (1978), and in Wyoming (CASE 1987). Since then it has also appeared in the Late Maastrichtian of Texas (CASE & CAPPETTA 1997) and New Jersey (CASE et al. 2001).

Family Sclerorhynchidae CAPPETTA 1974

Subfamily Ganopristinae

Genus *Borodinopristis* CASE 1987

Borodinopristis ackermani nov. sp.

(Plate 2, Fig. 23-31, Text-fig. 5)

Material: Eight specimens, including 5 oral teeth and 3 rostral spines.

Holotype: (CSUK97-2-52a), Plate 2, Fig. 23.

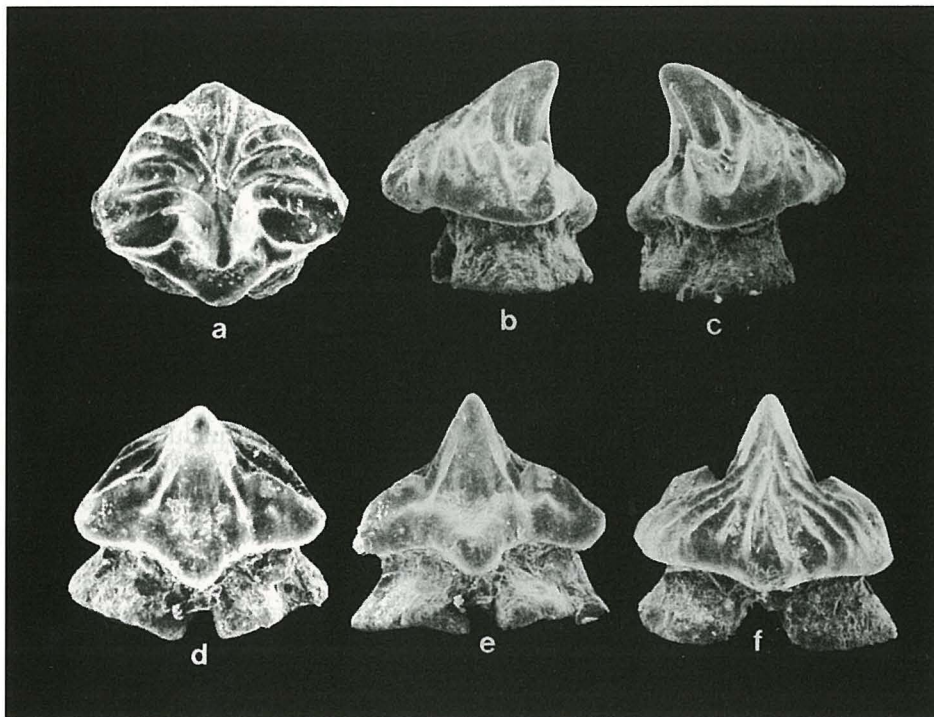
Paratypes: (CSUK97-2-52b), Plate 2, Fig. 24, (CSUK97-2-36), Plate 2, Fig. 25, (CSUK97-2-58), Plate 2, Fig. 26, and (CSUK97-2-53), Plate 2, Fig. 27.

Derivatio nominis: Species named after Mr. Frederick Ackerman of Matawan, N.J.

Referred specimens: (CSUK97-2-73), Plate 2, Fig. 28-29, (CSUK97-2-39), Plate 2, Fig. 30, and (CSUK97-2-56), Plate 2, Fig. 31.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.



Text-fig. 5. *Borodinopristis schwimmeri* CASE, a comparative specimen for *B. ackermani* nov. sp. a. Occlusal view. b. Right profile view. c. Left profile view. d. Lingual-occlusal view. e. Lingual view. f. Labial view.

Diagnosis: Teeth of minute size, less than 1 mm, some radiating sculpturing on the occlusal surface, basal structure is holaulacorhize (not shown).

Description: The oral teeth are microscopic with strong but few radiating ridges in occlusal aspect which begin at the apex of the crown in lingual aspect and end at the enamel base in labial aspect (Plate 2, Fig. 23). The rostral spines are not included in the description as they are to be treated as referred specimens.

Discussion: The genus *Borodinopristis* was erected by CASE (1987a) and the type species was named *schwimmeri*. The oral teeth of *B. ackermani* nov. sp. are compared here with the oral teeth of *B. schwimmeri* (Text-fig. 5). The size of the oral teeth of both species are approximately the same, though the oral teeth of *B. ackermani* nov. sp. have less ornamentation in the occlusal aspect, and no apparent lateral "shoulders" as opposed to *B. schwimmeri* (Text-fig. 5a and f).

The rostral spines (Plate 2, Fig. 28-31) are assigned as referred specimens, and are formally excluded from the type series. In comparison with the type species, the rostral spines of *B. ackermani* nov. sp. differ little from *B. schwimmeri* (CASE 1987).

Genus *Ischyrhiza* LEIDY 1856

Ischyrhiza georgiensis nov. sp.

(Plate 6, Fig. 120-125)

Material: Four specimens, all rostral spines.

Holotype: (CSUK97-2-74), Plate 6, Fig. 123-125.

Paratypes: (CSUK97-2-34a), Plate 6, Fig. 120, (CSUK97-2-41a), Plate 6, Fig. 121, and (CSUK97-2-41b), Plate 6, Fig. 122.

Derivatio nominis: Species named after the State of Georgia.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Rostral spines measuring 1 to 2 mm in height and width, ornate bases, enamel part of the spine contains striae and is about the 1/3rd the length of the spine.

Description: Minute rostral spines with vertical striae which surrounds the entire enamel portion (Plate 6, Fig. 124). The basal aspect fans out and is irregular (Plate 6, Fig. 121).

Discussion: This specimen differs from *Ischyrhiza avonicola* (ESTES 1964) in that the striae of *I. avonicola* are only at the base of the enamel and do not continue up the entire length of the spine as they do in *I. georgiensis* nov. sp.

Ischyrhiza mira LEIDY

(Plate 6, Fig. 126-132)

Material: Three specimens, including 2 oral teeth and 1 rostral spine.

Specimens: (CSUK97-2-15), Plate 6, Fig. 126-128, (CSUK97-2-51), Plate 6, Fig. 129, and (CSUK97-2-49), Plate 6, Fig. 130-132.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Oral teeth measuring from 3 to 7 mm on average in length (Plate 6, Fig. 129-132). Rostral spines (Plate 6, Fig. 126-128) contain no striae on the enamel (specimen illustrated is incomplete, missing the tip of the enamel). The average size of the spines are between 1 to 6 cm in height.

Discussion: This species has been known from the Turonian up to and including the Maastrichtian. For a more complete description and discussion of this common sawfish, see CAPPETTA & CASE (1975b) and WELTON & FARISH (1993).

Family Incertae sedis

Genus *Erguitaia* CAPPETTA 1989

Erguitaia benningensis nov. sp.

(Plate 5, Fig. 90-99)

Material: Two specimens, one anterior tooth and one antero-lateral tooth.

Holotype: (CSUK97-2-10), Plate 5, Fig. 90-94.

Paratype: (CSUK97-2-11), Plate 5, Fig. 95-99.

Derivatio nominis: Species named after Fort Benning.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Teeth of crushing nature with large crowns and some small amount of striae (or plications) on the apron extension of the crown in labial aspect (Plate 5, Fig. 94), plications extend up to the apex of the crown, the crown enamel is composed of osteodentine while the tooth itself is made up of orthodentine, the root is large, the tooth is basically triangular in shape and there are two large foramen, one on either side of the uvula of the tooth enamel and on the root in lingual aspect.

Description: Teeth averaging 4 mm, the anterior tooth (Plate 5, Fig. 90-94), has a prominent crown, and the antero-lateral tooth (Plate 5, Fig. 95-99) has the tip of its crown missing. There are some vertical striae running down the crown in labial aspect of the anterior tooth, while the antero-lateral tooth is badly worn and the striae are faint. The root of the tooth in basal aspect is holaulacorhize (Plate 5, Fig. 91).

Discussion: CAPPETTA (1989) described the genus *Erguitaia* based upon the existing genus *Rhynchobatus*. CAPPETTA changed the generic name *Rhynchobatus* to his new genus *Erguitaia*, but retained ARAMBOURG's specific name *arganiae*.

Erguitaia benningensis nov. sp. differs dramatically from *E. arganiae* by its elevated crown while *E. arganiae* has a low crown with a coronal ridge, and the tooth has short plicae on the enamel apron in labial aspect. There is a possibility that sexual dimorphism exists in this genus.

Erguitaia rugosa nov. sp.

(Plate 5, Fig. 100-104)

Material: One specimen, a lateral tooth.

Holotype: (CSUK97-2-12), Plate 5, Fig. 100-104.

Derivatio nominis: Species named for its rugose ornamentation (on the crown).

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Teeth of a crushing nature with low crowns and strong plications on the oral surface, with a pronounced apron extension (although incomplete) (Plate 5, Fig. 100-104).

Description: Teeth averaging 4 mm. *Erguitaia rugosa* nov. sp. has a shortened crown as opposed to the previous description. This tooth has strong longitudinal plications on the oral face (Plate 5, Fig. 100) as well as short striae on the apron extension in labial aspect (Plate 5, Fig. 103).

Discussion: *Erguitaia rugosa* nov. sp. differs from CAPPETTA's *E. arganiae* by the longitudinal plications on the oral face while *E. arganiae* has a plain or smooth crown with a pronounced coronal ridge.

This is the first occurrence in North America of the genus *Erguitaia* which was previously recovered from the Upper Cretaceous of the Kingdom of Morocco, in North Africa.

Genus *Ptychotrygon* JAEKEL 1894

Ptychotrygon chattahoocheensis nov. sp.

(Plate 5, Fig. 105-109)

Material: One specimen, a lateral tooth.

Holotype: (CSUK97-2-72), Plate 5, Fig. 105-109.

Derivatio nominis: Named after the County where the fossils were collected.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Species of *Ptychotrygon* characterized by small teeth (averaging 2 mm in total width), with a short crown and an extended apron in labial aspect, with a pronounced anterior coronal ridge and a faint posterior ridge just before the apron extension.

Description: The tooth in occlusal view has little ornamentation on the crown surface with the exception of a pronounced coronal ridge in the anterior region of the tooth and a less pronounced coronal ridge in the posterior region, just prior to the root apron. In a profile view (Plate 5, Fig. 108), the crown is slightly elevated. The root of the tooth is typically holaulacorhize.

Discussion: *Ptychotrygon chattahoocheensis* nov. sp. is a distinctive species based upon its elongated apron extension and a lack of a secondary coronal ridge in the center of the oral face of the tooth.

CASE & CAPPETTA (1997) list 15 species of *Ptychotrygon*, most found in North America. The North American species are as follows: *P. agujaensis* McNULTY & SLAUGHTER, Texas; *P. blainensis* CASE, Montana; *P. boothi* CASE, Wyoming; *P. cuspidata* CAPPETTA & CASE, New Jersey; *P. ellae* CASE, Wyoming; *P. greybullensis* CASE, Wyoming; *P. hooveri* McNULTY & SLAUGHTER, *P. ledouxi* CAPPETTA, South Dakota; *P. rubyae* WILLIAMSON, KIRKLAND & LUCAS, ARIZONA; *P. slaughteri* CAPPETTA & CASE, Texas; *P. vermiculata* CAPPETTA, New Jersey; and *P. winni* CASE & CAPPETTA, Texas.

Ptychotrygon eutawensis nov. sp.

(Plate 5, Fig. 110, Plate 6, Fig. 111-113, 116-117, and Text-fig. 6)

Material: Seven specimens, one anterior tooth, one antero-lateral tooth, and five lateral teeth.

Holotype: (CSUK97-2-45), Plate 5, Fig. 110.

Derivatio nominis: Species named after the formational name.

Paratypes: (CSUK97-2-38), Plate 6, Fig. 111, (CSUK97-2-43a), Plate 6, Fig. 112, (CSUK97-2-44), Plate 6, Fig. 113, (CSUK97-2-43b), Plate 6, Fig. 116, (CSUK97-2-64), Plate 6, Fig. 117, and (CSUK97-2-79), Text-fig. 6.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Diagnosis: Species of *Ptychotrygon* characterized by small teeth (averaging 2 mm in total width), the teeth are triangular in shape.

Description: In occlusal view (Plate 5, Fig. 110), the type specimen shows a crown of a triangular outline with a strong salient medio-labial protuberance forming an angle of about 90 degrees. The lingual border is slightly concave. The lateral teeth are elongated and triangular and have a slight coronal ridge (Text-fig. 6). The root is typically holaulacorhize.

Discussion: The teeth of *Ptychotrygon eutawensis* nov. sp. are similar in some respects to *P. winni* CASE & CAPPETTA (1997) with the exception of the ornamentation on their respective crowns.

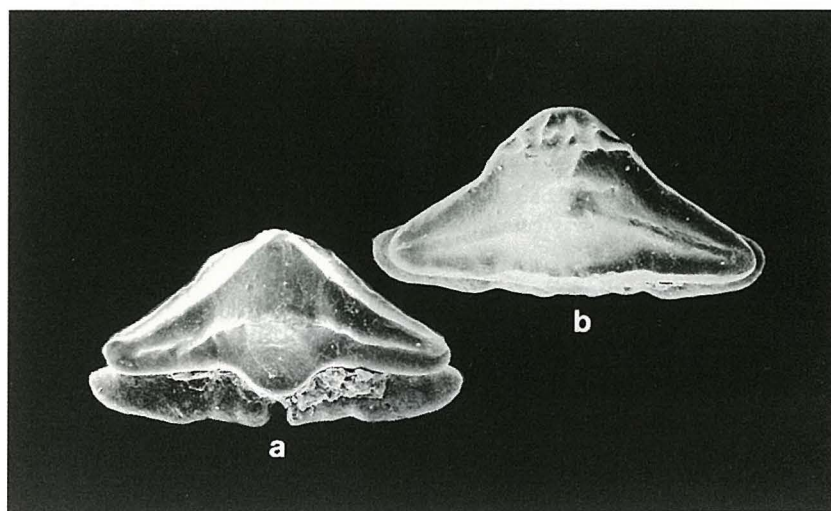
The teeth of *P. winni* are different in that the ornamentation is restricted to the enameled protuberance (apron) and the shortened plications are in a disorderly arrangement, whereas in the teeth of *P. eutawensis* nov. sp. the apron shows flowing plications from the crown.

Ptychotrygon cf. *triangularis* (REUSS)

(Plate 6, Fig. 114-115)

Material: Two specimens, one antero-lateral tooth and one lateral tooth.

Specimens: (CSUK97-2-42b), Plate 6, Fig. 115, and (CSUK-2-42a), Plate 6, Fig. 114.



Text-fig. 6. *Ptychotrygon eutawensis* nov. sp. Paratype. a. Lingual view. b. Occlusal view, same specimen.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Microscopic teeth, oval shaped, with primary and secondary ridges (corresponding to coronal ridges). There is a slight concavity in the lingual border (Plate 6, Fig. 115), and the teeth have a holaulacorhize root structure.

Discussion: The teeth of *Ptychotrygon* cf. *triangularis* are known from Europe and in Texas, U.S.A., from the Kiest Boulevard site (Turonian-Coniacian contact), (CAPPETTA & CASE 1999).

Ptychotrygon sp.

(Plate 6, Fig. 118-119)

Material: One specimen, a rostral spine.

Specimen: (CSUK97-2-32), Plate 6, Fig. 118-119.

Locality: Entrance to Fort Benning Military Reservation in the highway cut of Interstate 185.

Age: Early to Middle Santonian, Eutaw Formation.

Description: Rostral denticles of an unknown species of batoid fish. The spines or denticles are extremely small (averaging 3 mm). The spine or denticle is mostly root (at least in its anterior aspect) (Plate 6, Fig. 118), while the enamel portion is at the tip and in the posterior aspect (Plate 6, Fig. 119) it extends down the root of the spine, almost 50 percent.

Discussion: The authors assume that this is a rostral spine or denticle of *Ptychotrygon* as opposed to a spine or denticle from *Ischyrrhiza*.

4. Summary and conclusions

This is the first study of the Early to Middle Santonian Eutaw Formation, and now allows us to describe a fauna comprised of eleven selachians (sharks) and six batoids (rays, skates and sawfishes). The shark species are comprised of two new generic forms along with new specific names: *Columbusia fragilis* nov. gen., nov. sp., and *Microdontaspis tenuis* nov. gen., nov. sp., while the following are previously described species types (cosmopolitan in nature): *Lissodus babulskii* (CAPPETTA & CASE), *Ptychodus mortoni* MANTELL, *Squatina hassei* LERICHE, *Chiloscyllium* sp., *Scapanorhynchus raphiodon* (AGASSIZ), *Cretolamna appendiculata* AGASSIZ, *Cretodus borodini* (CAPPETTA and CASE), and *Squalicorax falcatus* (AGASSIZ).

The batoids (Skates, rays and sawfishes) are represented in this work by the following: *Pseudohypolophus ellipsis* nov. sp., *Borodinopristis ackermani* nov. sp., *Ischyrrhiza georgiensis* nov. sp., *Erguitaia benningensis* nov. sp., *Erguitaia rugosa* nov. sp., *Ptychotrygon chattahoocheensis* nov. sp., and *Ptychotrygon eutawensis* nov. sp. The following batoids have been described previously: *Protoplatyrhina renae* CASE, *Ischyrrhiza mira* LEIDY and *Ptychotrygon* cf. *triangularis* (REUSS).

The total of the fauna is 22 species types, of which 9 are new to science.

The fauna represents a near shore paleoenvironment, and since the vertebrate remains (selachians and teleosteans) have been recovered in an oyster shell bed, this would indicate that the specimens come from a bioherm.

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The specimens, types, paratypes and figured will all be housed in the collection of Columbus State University, Columbus, Georgia. The acronym for this collection is CSUK.

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Explanation of plates

Plate 1

- Fig. 1–7. *Hybodus* sp.
1. (CSUK 97-2-1), × 4.5. Lateral tooth, labial view.
 2. (CSUK 97-2-1), × 4.5. Lingual tooth, same specimen.
 3. (CSUK 97-2-65), × 15. Fragment of lateral tooth, labial view (SEM).
 4. (CSUK 97-2-66), × 20. Fragment of lateral tooth, labial view (SEM).
 5. (CSUK 97-2-2), × 2.5. Distal portion of spine, left lateral view.
 6. (CSUK 97-2-2), × 2.5. Posterior view, same specimen.
 7. (CSUK 97-2-2), × 2.5. Right lateral view, same specimen.
- Fig. 8–11. *Lissodus babulskii* (CAPPETTA & CASE)
8. (CSUK 97-2-23), × 25. Labial view, lateral tooth (SEM).
 9. (CSUK 97-2-47), × 20. Labial view, lateral tooth (SEM).
 10. (CSUK 97-2-33), × 25. Occlusal view, see fig. 8 (SEM).
 11. (CSUK 97-2-47), × 20. Labial-basal view, see fig. 9 (SEM).
- Fig. 12. *Protoplatyrhina renae* CASE.
12. (CSUK 97-2-59), × 35. Lingual-occlusal view, anterior tooth (SEM).
- Fig. 13–16. *Squatina hassei* LERICHE
13. (CSUK 97-2-71), × 17. Lingual view, lateral tooth (SEM).
 14. (CSUK 97-2-71), × 17. Profile view, same specimen (SEM).
 15. (CSUK 97-2-71), × 17. Basal view, same specimen (SEM).
 16. (CSUK 97-2-71), × 17. Occlusal view, same specimen (SEM).
- Fig. 17–22. *Chiloscyllium* sp.
17. (CSUK 97-2-70), × 12. Occlusal view, lateral tooth (SEM).
 18. (CSUK 97-2-70), × 12. Right profile view, same specimen (SEM).
 19. (CSUK 97-2-70), × 12. Lingual view, same specimen (SEM).
 20. (CSUK 97-2-70), × 12. Left profile view, same specimen (SEM).
 21. (CSUK 97-2-70), × 12. Labial view, same specimen (SEM).
 22. (CSUK 97-2-70), × 12. Semi-labial view, same specimen (SEM).

Plate 2

- Fig. 23–31. *Borodinopristis ackermani* n. sp.
23. Holotype (CSUK 97-2-52a), × 40. Oral tooth, occlusal view (SEM).
 24. Paratype (CSUK 97-2-52b), × 40. Oral tooth, occlusal view (SEM).
 25. Paratype (CSUK 97-2-36), × 35. Oral tooth, occlusal view (SEM).
 26. Paratype (CSUK 97-2-58), × 45. Oral tooth, occlusal view (SEM).
 27. Paratype (CSUK 97-2-53), × 45. Oral tooth, occlusal view (SEM).
 28. (CSUK 97-2-73), × 27. Rostral spine, posterior view (SEM).
 29. (CSUK 97-2-73), × 25. Rostral spine, lateral view, same specimen (SEM).
 30. (CSUK 97-2-39), × 12. Rostral spine, posterior-lateral view (SEM).
 31. (CSUK 97-2-56), × 11. Rostral spine, left lateral view (SEM).

- Fig. 32-36. *Columbusia fragilis* n. gen., n. sp.
32. Holotype (CSUK 97-2-48), × 20. Occlusal view, lateral tooth (SEM).
33. Holotype (CSUK 97-2-48), × 20. Labial view, same specimen (SEM).
34. Holotype (CSUK 97-2-48), × 22. Labio-basal view, same specimen (SEM).
35. Paratype (CSUK 97-2-61), × 30. Occlusal view, lateral tooth (SEM).
36. Paratype (CSUK 97-2-61), × 25. Basal view, same specimen (SEM).
- Fig. 37-42. *Pseudohypolophus ellipsis* n. sp.
37. Holotype (CSUK 97-2-13), × 3.5. Occlusal view, lateral tooth.
38. Holotype (CSUK 97-2-13), × 3.5. Right lateral view, same specimen.
39. Holotype (CSUK 97-2-13), × 3.5. Labial view, same specimen.
40. Holotype (CSUK 97-2-13), × 3.5. Basal view, same specimen.
41. Holotype (CSUK 97-2-13), × 3.5. Left lateral view, same specimen.
42. Holotype (CSUK 97-2-13), × 3.5. Lingual view, same specimen.

Plate 3

- Fig. 43-48. *Squalicorax falcatus* (AGASSIZ).
43. (CSUK 97-2-17), × 4. Labial view, anterior tooth.
44. (CSUK 97-2-17), × 4. Lingual view, same specimen.
45. (CSUK 97-2-18), × 2. Lingual view, lateral tooth.
46. (CSUK 97-2-18), × 2. Labial view, same specimen.
47. (CSUK 97-2-19), × 2. Labial view, antero-lateral tooth.
48. (CSUK 97-2-19), × 2. Lingual view, same specimen.
- Fig. 49-58. *Cretolamna appendiculata* AGASSIZ.
49. (CSUK 97-2-22), × 3. Labial view, postero-lateral tooth.
50. (CSUK 97-2-22), × 3. Lingual view, same specimen.
51. (CSUK 97-2-25), × 4. Labial view, anterior tooth.
52. (CSUK 97-2-25), × 4. Lingual view, same specimen.
53. (CSUK 97-2-24), × 2. Labial view, antero-lateral tooth.
54. (CSUK 97-2-24), × 2. Lingual view, same specimen.
55. (CSUK 97-2-21), × 2. Lingual view, lateral tooth.
56. (CSUK 97-2-21), × 2. Labial view, same specimen.
57. (CSUK 97-2-20), × 3. Labial view, antero-lateral tooth.
58. (CSUK 97-2-20), × 3. Lingual view, same specimen.
- Fig. 59-64. *Cretodus* cf. *borodini* (CAPPETTA & CASE).
59. (CSUK 97-2-4), × 2. Lingual view, anterior tooth.
60. (CSUK 97-2-4), × 2. Lateral view, same specimen.
61. (CSUK 97-2-4), × 2. Labial view, same specimen.
62. (CSUK 97-2-14), × 3. Labial view, anterior tooth.
63. (CSUK 97-2-14), × 3. Lateral view, same specimen.
64. (CSUK 97-2-14), × 3. Lingual view, same specimen.

Plate 4

- Fig. 65-68. *Scapanorhynchus raphiodon* AGASSIZ.
65. (CSUK 97-2-27), × 1.5. Labial view, anterior tooth.
66. (CSUK 97-2-27), × 1.5. Lingual view, same specimen.
67. (CSUK 97-2-30), × 3. Lingual view, lateral tooth.
68. (CSUK 97-2-30), × 3. Labial view, same specimen.
- Fig. 69-70. *Microdontaspis tenuis* n. gen., n. sp.
69. Paratype (CSUK 97-2-77), × 20. Lingual view, antero-lateral tooth (SEM).
70. Paratype (CSUK 97-2-77), × 20. Labial view, same specimen (SEM).
- Fig. 71-72. *Scapanorhynchus raphiodon* AGASSIZ.
71. (CSUK 97-2-28), × 2.5. Lingual view, anterior tooth.
72. (CSUK 97-2-28), × 2.5. Labial view, same specimen.
- Fig. 73-74. *Microdontaspis tenuis* n. gen., n. sp.
73. Paratype (CSUK 97-2-9), × 8. Lingual view, anterior tooth (SEM).
74. Paratype (CSUK 97-2-9), × 8. Labial view, same specimen (SEM).
- Fig. 75-82. *Scapanorhynchus raphiodon* AGASSIZ.
75. (CSUK 97-2-29), × 2.5. Labial view, lateral tooth.

76. (CSUK 97-2-29), × 2.5. Lingual view, same specimen.
77. (CSUK 97-2-7), × 8. Lingual view, anterior tooth.
78. (CSUK 97-2-7), × 8. Labial view, same specimen.
79. (CSUK 97-2-31), × 2. Lingual view, antero-lateral tooth.
80. (CSUK 97-2-31), × 2. Labial view, same specimen.
81. (CSUK 97-2-26), × 1.5. Lingual view, anterior tooth.
82. (CSUK 97-2-26), × 1.5. Labial view, same specimen.
Fig. 83-89. *Microdontaspis tenuis* n. gen., n. sp.
83. Paratype (CSUK 97-2-75), × 40. Lingual view, lateral tooth (SEM).
84. Paratype (CSUK 97-2-75), × 40. Labial view, same specimen (SEM).
85. Holotype (CSUK 97-2-8), × 13. Labial view, anterior tooth (SEM).
86. Holotype (CSUK 97-2-8), × 13. Lateral view, same specimen (SEM).
87. Holotype (CSUK 97-2-8), × 13. Lingual view, same specimen (SEM).
88. Paratype (CSUK 97-2-76), × 45. Lingual view, lateral tooth (SEM).
89. Paratype (CSUK 97-2-76), × 45. Labial view, same specimen (SEM).

Plate 5

- Fig. 90-99. *Erguitaia benningensis* n. sp.
90. Holotype (CSUK 97-2-10), × 8. Lingual view, anterior tooth.
91. Holotype (CSUK 97-2-10), × 8. Basal view, same specimen.
92. Holotype (CSUK 97-2-10), × 8. Lateral view, same specimen.
93. Holotype (CSUK 97-2-10), × 8. Occlusal view, same specimen.
94. Holotype (CSUK 97-2-10), × 8. Labial view, same specimen.
95. Paratype (CSUK 97-2-11), × 10. Occlusal view, antero-lateral tooth.
96. Paratype (CSUK 97-2-11), × 10. Basal view, same specimen.
97. Paratype (CSUK 97-2-11), × 10. Lateral view, same specimen.
98. Paratype (CSUK 97-2-11), × 10. Lingual view, same specimen.
99. Paratype (CSUK 97-2-11), × 10. Labial view, same specimen.
Fig. 100-104. *Erguitaia rugosa* n. sp.
100. Holotype (CSUK 97-2-12), × 6. Occlusal view, lateral tooth.
101. Holotype (CSUK 97-2-12), × 6. Basal view, same specimen.
102. Holotype (CSUK 97-2-12), × 6. Lateral view, same specimen.
103. Holotype (CSUK 97-2-12), × 6. Lingual view, same specimen.
104. Holotype (CSUK 97-2-12), × 6. Labial view, same specimen.
Fig. 105-109. *Ptychotrygon chattahoocheensis* n. sp.
105. Holotype (CSUK 97-2-72), × 25. Occlusal view, lateral tooth (SEM).
106. Holotype (CSUK 97-2-72), × 25. Labial view, same specimen (SEM).
107. Holotype (CSUK 97-2-72), × 25. Right profile view, same specimen (SEM).
108. Holotype (CSUK 97-2-72), × 25. Left profile view, same specimen (SEM).
109. Holotype (CSUK 97-2-72), × 25. Lingual view, same specimen (SEM).
Fig. 110. *Ptychotrygon eutawensis* n. sp.
110. Paratype (CSUK 97-2-45), × 35. Occlusal view, antero-lateral tooth (SEM).

Plate 6

- Fig. 111-113. *Ptychotrygon eutawensis* n. sp.
111. Paratype (CSUK 97-2-38), × 35. Oral tooth, occlusal view, anterior tooth (SEM).
112. Paratype (CSUK 97-2-43a), × 22. Oral tooth, occlusal view, lateral tooth (SEM).
113. Paratype (CSUK 97-2-44), × 45. Oral tooth, occlusal view, lateral tooth (SEM).
Fig. 114-115. *Ptychotrygon* cf. *triangularis* (REUSS).
114. Paratype (CSUK 97-2-42a), × 70. Oral tooth, occlusal view, lateral tooth (SEM).
115. Holotype (CSUK 97-2-42b), × 37. Oral tooth, occlusal view, antero-lateral tooth (SEM).
Fig. 116-117. *Ptychotrygon eutawensis* n. sp.
116. Paratype (CSUK 97-2-43b), × 35. Oral tooth, occlusal view, lateral tooth (SEM).
117. Paratype (CSUK 97-2-64), × 22. Oral tooth, occlusal view, lateral tooth (SEM).
Fig. 118-119. *Ptychotrygon* sp.
118. (CSUK 97-2-32), × 15. Rostral spine, lateral view (SEM).
119. (CSUK 97-2-32), × 15. Rostral spine, posterior view, same specimen (SEM).
Fig. 120-125. *Ischyrrhiza georgiensis* n. sp.

120. Paratype (CSUK 97-2-34a), × 30. Rostral spine, occlusal view (SEM).
 121. Paratype (CSUK 97-2-41a), × 35. Rostral spine, occlusal view (SEM).
 122. Paratype (CSUK 97-2-41b), × 40. Rostral spine, occlusal view (SEM).
 123. Holotype (CSUK 97-2-74), × 17. Rostral spine, occlusal view (SEM).
 124. Holotype (CSUK 97-2-74), × 17. Rostral spine, lateral view (SEM).
 125. Holotype (CSUK 97-2-74), × 17. Rostral spine, posterior view (SEM).
- Fig. 126-132. *Ischyrbiza mira* LEIDY
126. (CSUK 97-2-15), × 4. Rostral spine, posterior view.
 127. (CSUK 97-2-15), × 4. Rostral spine, anterior view.
 128. (CSUK 97-2-15), × 4. Rostral spine, lateral view.
 129. (CSUK 97-2-51), × 17. Oral tooth, occlusal view (SEM).
 130. (CSUK 97-2-49), × 17. Oral tooth, occlusal view (SEM).
 131. (CSUK 97-2-49), × 12. Oral tooth, lateral view (SEM).
 132. (CSUK 97-2-49), × 15. Oral tooth, lingual view (SEM).