A PARTIAL ROSTRUM OF THE SAWFISH PRISTIS LATHAMI GALEOTTI, 1837, FROM THE EOCENE OF SOUTH CAROLINA

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INTRODUCTION

Sawfishes of the family Pristidae comprise a group of rays having dorsoventrally flattened, sharklike bodies and elongated rostra bearing a row of teeth on each side. Some species may attain total body lengths (TL) of 7 m or more (Compagno and Last, 1999). Unlike the similarly-shaped sawsharks of the family Pristiophoridae, the number of rostral teeth and their proportions are established in utero and maintained into adulthood (Slaughter and Springer, 1968; Miller, 1974), and if a tooth is lost the alveolus remains empty. In addition, the gills are located on the underside of the body and there are no rostral barbels (Tricas et al., 1997; Compagno and Last, 1999). Recent Pristidae consists of five to seven species (depending on synonymy) within two genera, Pristis (Linck, 1790) and Anoxypristis (White and Moy-Thomas, 1941).

Although oral teeth and partial rostra have been described (Casier, 1949; Cappetta, 1987), remnants of fossil pristids consist primarily of rostral teeth. It is quite possible, therefore, that the apparent species diversity, often based on relatively few specimens, is exaggerated (see Casier, 1949). Cappetta (1987) reported that the temporal distribution of the genus Pristis extends from the Early Eocene (Ypresian) to Recent, and published records indicate that the extinct species, Pristis galeotti (Galeotti, 1837), was limited to the Eocene (see below). However, Case (1994) described fragmentary specimens from Louisiana that indicate Pristis occurred as early as the Late Paleocene.

In North America, Pristis lathami has been reported from the Eocene of Alabama (White, 1956; Thurmond and Jones, 1981), Arkansas (Westgate, 1984), Georgia (Müller, 1999; Case and Bordin, 2000a; Westgate, 2001), Louisiana (Manning and Standaert, 1978; Miller, 1974), Maryland (Ward and Wiest, 1990), Mississippi (Leriche, 1942), New Jersey (Fowler, 1911), North Carolina (Timmerman and Chandler, 1995; Case and Bordin, 2000b), and Virginia (Kent, 1999). Additional records include the Paris Basin (Galeotti, 1837; Leriche, 1905; Casier, 1949), England (Kemp et al., 1990), Egypt (Strömer, 1905; Case and Cappetta, 1990), Morocco (Arambourg, 1952), and Togo (Cappetta, 1987).

Recently, staff and volunteers of the South Carolina State Museum (SC) recovered a specimen consisting of the proximal 78 cm of a P. lathami rostrum from the Lafarge Cement quarry (formerly Blue Circle Cement) near Harleville in Dorchester County, South Carolina. Other rostra were observed in the nearby Giant Portland Cement quarry, but these had been completely destroyed. The Lafarge specimen is significant because it is thus far the most complete fossil sawfish rostrum from North America. The purpose of this report is to describe this specimen and discuss its paleobiological significance.

SYSTEMATIC PALEONTOLOGY

Miller (1995) tentatively concluded that rostral teeth are intermediate between oral teeth and dermal denticles in that their initial development is more similar to that of dermal denticles, but their size, which is related to their function, determines their mode of attachment in deep alveoli. The term “rostral tooth” has been used in previous reports (Thorson, 1973; Miller, 1974, 1995; Selliis and Berkovitz, 1980; Schwartz, 2003) and is utilized here.

Although an abbreviated taxonomy is presented below, comprehensive discussions on pristid phylogeny can be found in Carvalho (1996), Carvalho and Maisey (1996), Shirai (1996), and Kriwet (2004).

Class CHONDRICHTHYES Huxley, 1880
Superorder PRISTIORAE Carvalho, 1996
Family PRISTIDAE Bonaparte, 1838
Genus PRISTIS Linck, 1790
PRISTIS LATHAMI Galeotti, 1837

Figure 1

Pristis bisulcatus (Agassiz, 1843), Casier, 1946, p. 97. LERICHE (1905, p. 98) synonymized P. hastingsae (Agassiz, 1843), P. parisensis (Gervais, 1852), and P. contortus (Dixon, 1850) with P. bisulcatus.

Description.—Unfortunately, mining operations destroyed an unknown portion of the rostrum. As such, only the proximal 78 cm was recovered (Fig. 1.1). The preserved portion is dorsoventrally flattened and gently tapers from its origin in front of the head towards the missing tip. A series of regularly spaced rectangular projections emanate from the main body of the rostrum, and the edges of these form the alveoli of the rostral teeth. From the arrangement of the alveoli, it appears that the rostral teeth of the right and left sides were slightly staggered (rather than opposing).

The rostrum is formed of three layers of mineralized cartilage tesserae, and internally the rostrum is divided into a rectangular medial canal and two elliptical lateral canals (paracentral canals of Miller [1995]; see Fig. 1.2). Two layers of cartilage form the lateral canals (first and second internal calcified layers of Casier [1949]), and the third, outer layer (external calcified layer of Casier [1949]) envelops the canals and forms the lateral cartilage projections. Although the lateral cartilage projections of SC2001.1 are hollow, there is no indication that they form a canal extending the entire length of the rostrum as indicated by Casier (1949, p. 12, fig. 1).

The dorsal and ventral surfaces of the rostrum are weakly convex, have a fibrous texture (superficial calcified layer of Casier [1949]), and bear two distinct grooves running the entire length of the preserved portion of the rostrum. Each groove is just lateral to the midline (paracentral of Miller [1974]), and they are parallel to the sides of the rostrum. A large fenestra was formed from two bars of cartilage that connected the rostrum to the chondrocranium.

The rostral teeth of P. lathami (Fig. 1.4) are thick, elongated, and curve ventrally. Dorsal and ventral surfaces are only weakly convex. The anterior edge is highly convex except for a short, weakly developed sulcus near the apex. In contrast, the posterior edge bears a deep sulcus running the length of the tooth, and there is a distinct ridge on both the dorsal and ventral margins. The proximal half of each rostral tooth bears a series of closely spaced longitudinal flutes that are intersected by fine transverse, crescent-shaped growth lines, and the anterior and posterior edges are parallel. Each tooth exhibits clear signs of wear, with the distal half of each specimen being smooth and tapering to a point.

Material examined.—SC2001.1, proximal 78 cm of rostrum and four associated rostral teeth.