

AN UNUSUAL NAYADINA (BIVALVIA:MALLEIDAE)  
FROM THE EOCENE OF SOUTH CAROLINA

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*Nayadina (Exputens)* is a North American, Eocene, warm-water, malleid bivalve with Old World Tethyan affinities. Three species are known, and the one with the most widespread distribution is *N. (E.) batequensis* Squires, 1990, from northwestern Jamaica, the southern part of Baja California, Mexico, and western Washington. In Jamaica, the age of this species is only generally known as Early to Middle Eocene, but elsewhere its age is considered Early Eocene (Squires, 1990, 1992; Squires and Goedert, in press). The second species is the Early to Middle Eocene *N. (E.) llajasensis* (Clark, 1934) from southern and central California, central Oregon, and western Washington (Squires, 1990, 1992). The third species is the Middle to Late Eocene *N. (E.) ocalensis* (MacNeil, 1934) from Florida, Georgia, and North Carolina (Squires, 1990). Specimens of *Nayadina (Exputens)* sp., recently discovered in South Carolina by D. Campbell (this volume), may also represent *N. (E.) ocalensis*.

*Exputens* either immigrated into North America from the Old World via the circum-equatorial current that flowed east to west during the Early Eocene or the subgenus originated in the Jamaica area (Squires, 1992).

Recent preparation and study of a well-preserved single valve of a malleid specimen, which has been housed in the collections at the Florida Museum of Natural History (UF) for many years, revealed that the bivalve is a *Nayadina (Exputens)*. The specimen (UF 66044) was collected in 1975 by Muriel Hunter and Joseph Banks from a large boulder on the floor of the Martin Marietta Berkeley Quarry, Berkeley County, southern South Carolina. The quarry, which is about 75 km northwest of Charleston and 2.4 km south of the inter-

section of Route 6 and Route 59, near the town of Eutaw Spring, is shown on the U. S. Geological Survey, 7.5-minute, Cross Quadrangle, 1987 edition. The specimen is from the Santee Limestone and was embedded in a gray, well-indurated bioclastic limestone containing other bivalves, the large benthic foraminifera *Lepidocyliina*, and fragments of bryozoans. No other complete valves of *Exputens* were found in the quarry although numerous fragments were detected.

Harris and Zullo (1980, fig. 3) correlated the Santee Limestone to the entire Claiborne Stage (Middle Eocene) of the Gulf Coast. They also interpreted this limestone to be composed of calcareous bank deposits that accumulated on a broad, low-lying foreland area over which the sea transgressed rapidly. Ward *et al.* (1979) designated the neostatotype for the Santee Limestone to be the Berkeley Quarry.

Specimen UF 66044 is 20.5 cm in length and 11.5 cm in height. It is about four times as large as any previously known specimen of *Nayadina (Exputens)*; namely, a 5.38 cm long specimen of *N. (E.) llajasensis* from southern California. The valve of specimen UF 66044 has a prominently curved shape, with a peculiar pincher-like anterior end (plate 1, figures 1, 2). The posterior end is quadrate. The valve is moderately smooth except on its medial area where weathering has exposed irregular commarginal lamellae. The beak is prosogyrate, very low, and in the middle of the anterior half of the valve. The ligamental pit is 3 cm in length (measured parallel to the hinge), and a narrow byssal sinus is detectable in the beak area (plate 1, figure 3). The hinge area is flat and smooth posteriorly to the ligamental pit but is thickened and projecting anteriorly.

Squires (1990) showed that *Exputens*

had an epifaunal nestling mode of life, with attachment of the dorsal side (hinge side) by byssus to hard substrate, and a very wide range in morphologic variation. Specimen UF 66044 rested on the thickened portion of its hinge line that extended from the beak to the anterior end. Some elongation took place anteriorly but growth eventually began around some foreign object, like turtle grass, and resulted in the pincher-shaped anterior end. Posteriorly from the beak, the shell curved ventrally upward and outward.

Although UF 66044 differs from any known species of *Exputens* in regards to its large size and distinctive curved shape, we are reluctant to name a new species based on a single specimen of a bivalve that is well known for considerable morphologic variation. More specimens are needed to define fully this malleid from the Santee Limestone.

Specimen UF 66044 and those specimens referred to as *Nayadina (Exputens)* sp. by D. Campbell (this volume) represent the earliest records of *Exputens* in the southeastern United States and the first report of this subgenus in South Carolina.

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January 31, 1995

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PLATE 1

Figures

- 1-3. *Nayadina (Exputens)* sp., right valve, length 20.5 cm, height 11.5 cm, UF 66044, from Santee Limestone (Middle Eocene), Martin Marietta Berkeley Quarry, Berkeley County, South Carolina.
1. Exterior, X 0.6.
  2. Interior, X 0.6.
  3. Close-up of hinge-line interior, X 1.



PLATE 1

(continued from p. 178)

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