

A NEW SPECIES OF *ERVILIA* FROM NORTH BRAZIL (BIVALVIA, SEMELIDAE)

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Abstract *Ervilia asymmetrica* is a new species described for the Northern Coast of Brazil. A more elongated outline and an umbo more asymmetrical are main diagnostic characters of this taxon. Comparison with other Western Atlantic species of this genus is also performed.

Key words *Ervilia asymmetrica*, new species, Western Atlantic, Brazil, Semelidae.

INTRODUCTION

On a recent expedition carried out by the "PIATAM Oceano" Project developed by Petrobras S/A, in Northern Brazilian coast, a new species of the genus *Ervilia* Turton 1822 was collected in sediment dredged by RV "Amorim do Valle", in the Amazon River mouth, Pará State, on the continental shelf, near the slope. This study presents the formal description of the new species, under a comparative scenario with other representatives of the genus.

Ervilia Turton 1822 (type species by monotypy *Mya nitens* Montagu 1808 from the Western Atlantic and Caribbean Sea) is a genus that is distributed in the Western Atlantic, from Cape Hatteras (USA) to Uruguay, on the eastern side in the UK, Portugal, northern coast of Africa (Macedo *et al.*, 1999) and in the Mediterranean Sea and Arabian Gulf (Bosch *et al.*, 1994). The genus is characterized by its ellipsoidal shell shape, with presence of concentric delicate grooved lines, by the ligament being both external and internal, by the internal ligament being positioned on the resilifer, and in the concavity being in the ventral side of the pallial line, immediately ventral to the pallial sinus.

The systematic allocation of *Ervilia* has varied. It has been considered a mastrid (e.g. Gould, 1861) or a mesodesmatid (e.g. Dall, 1895), mainly based on the internal resilifer as a diagnostic character. Later the genus was transferred to the tellinoidean family Semelidae, because of the presence of a cruciform muscle (Morton & Scott, 1990). The concept of the species in the Western

Atlantic has also been inconstant. Some authors have included a single species – *E. nitens* (e.g., Rooij-Schuiling, 1972), while others have considered it to comprise from three to seven species (e.g., Abbott, 1974; Rios, 1994, 2009). This confusion is related to close similarity and difficulty distinguishing the shells. The samples studied herein differ from all others in presenting the outstanding character of a non-central umbo.

MATERIALS AND METHODS

Samples containing the new species were dredged between January and March 2009. All specimens were disarticulated. Type specimens of the new species were deposited at the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP). Representatives of other *Ervilia* species from the Western Atlantic present in MZSP collection were measured and compared with the new species. These others are as follows. *Ervilia nitens*: USA, Florida, Bower county, MZSP 41440, 2 valves; Brazil, São Paulo, Ubatuba, MZSP 22236, 6 valves, MZSP 22237, 5 valves, MZSP 22238, 3 valves, MZSP 22241, 10 valves. *E. concentrica*: USA, Florida, Brower County, MZSP 41441, 15 valves; Brazil, São Paulo; São Sebastião, MZSP 26402, 2 valves; Ubatuba, MZSP 34931, 15 valves. *E. subcancellata*: Brazil, Paraíba; João Pessoa, MZSP 83892, 16 valves; Bahia, Corumbau, MZSP 83892, 10 valves. All the measurements were made using manual calipers. Material was examined by stereomicroscopy and also with the Scanning Electron Microscope (SEM) in the Laboratório de Microscopia Eletrônica of MZSP.

SYSTEMATICS

Ervilia asymmetrica sp. nov.
(Figs 1–7)

Types Holotype MZSP 96885 (left valve)
Paratypes: MZSP 96886 (right valve), 96887 (right valve), 96888 (left valve), all from type locality.

Type locality Brazil, Pará State, Amazon River mouth, 85 km off Ilha Mexiana, 0°27'23.28" N 48°13'56.84"W (Franklin Noel dos Santos coll., 10/iii/2009; PIATAM Oceano – Petrobras).

Diagnosis Shell elongate, inaequilateral, somewhat laterally compressed. Umbo in anterior third. Dorso-anterior edge straight to slightly convex.

Description Shell length up to 8.0 mm long, outline elliptic, width ~64% of length, height ~40% of length. Ratio of anterior length/entire length ranging from 0.32 to 0.35. Colour pale yellow to greenish yellow. Periostracum transparent, glossy. Anterior edge of shell more broadly rounded than posterior edge; dorsal margin weakly triangular. Umbos weakly protuberant, close to each other, located between anterior and middle thirds. Concavity in dorso-posterior margin weakly developed (Figs 1, 2). Sculptured by ~50 concentric ribs, each rib relatively low, profile rounded, separated from each other by space equivalent to rib width. Posterior ribs taller than anterior ribs, obsolete close to umbo. Radial lines present in anterior third, each line marked by aligned small nodes located at tip of concentric ribs (Fig. 5), with about same width as ribs and weakening towards umbo and ventral margin.

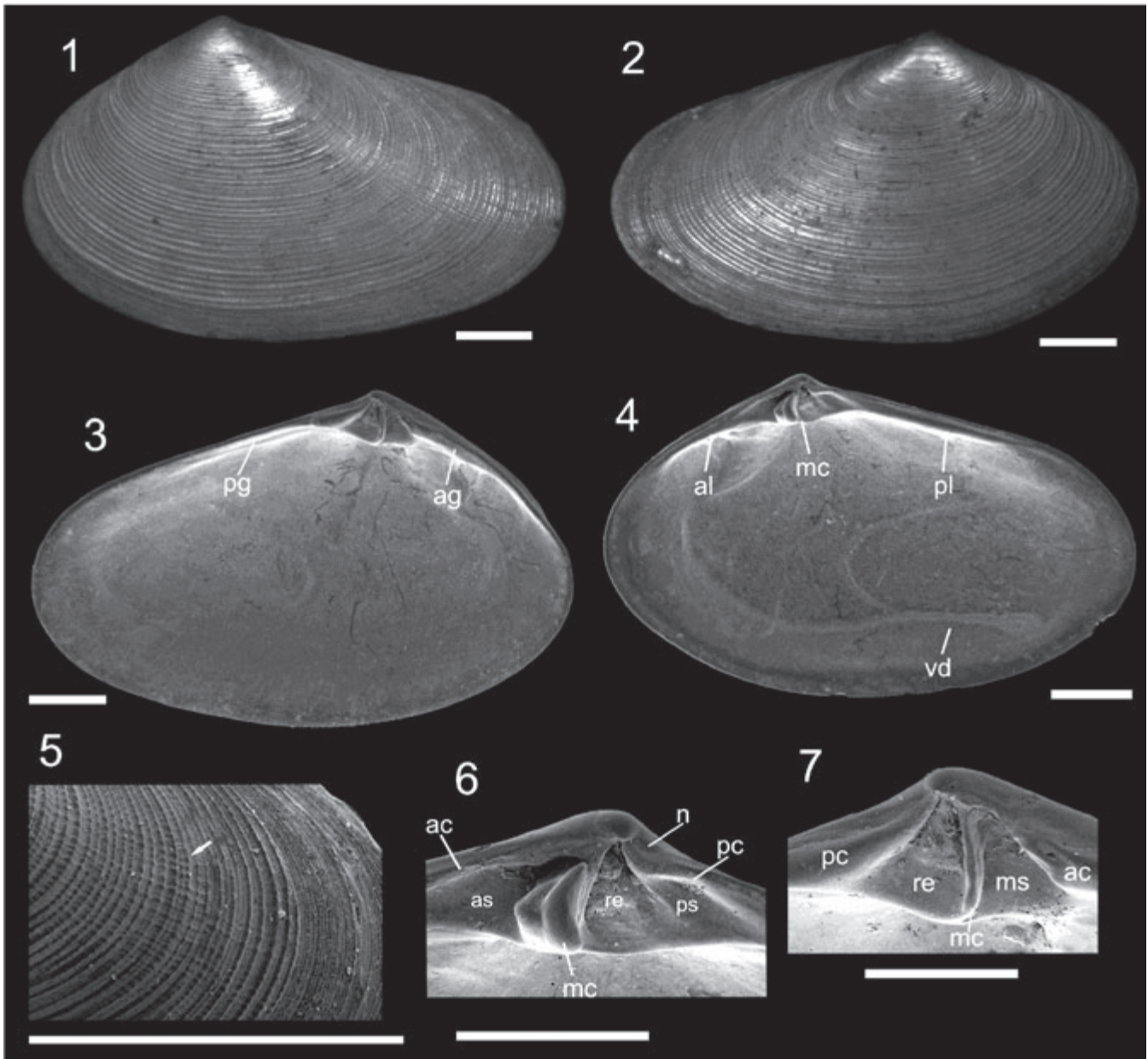
External ligament placed in nymph, length equivalent to 1/3 of that of median cardinal tooth. In left valve nymph less concave than in right valve. Nymph of right valve about half size of left nymph. Internal ligament in resilifer. Resilifer (re) triangular in both valves (Figs 6, 7), representing 1/3 of cardinal area, bounded by median cardinal tooth and posterior cardinal tooth. In right valve resilifer branching by posterior lobe of median cardinal tooth and a socket corresponding to posterior cardinal tooth of left valve (Fig. 7). Median cardinal tooth (mc) present in both valves (Figs 6, 7). Right tooth triangular, bifid, with posterior and anterior lobes, thinner close to umbo, becoming large towards ventral, pointing ventrally-anteriorly and occupying 1/3 of hinge area. Most

posterior lobe larger than anterior lobe (Fig. 6). Left median cardinal teeth less developed, occupying less than 1/4 of cardinal area, separating resilifer area from socket relative to right median cardinal tooth (Fig. 6: ms). Posterior (pc) and anterior cardinal teeth (ac) present in both valves (Figs 6, 7). Right cardinal teeth overlapping left cardinal. In left valve posterior cardinal tooth located between left nymph and resilifer, about 1.2 times higher than median cardinal tooth. Right valve posterior cardinal tooth less developed than cardinal tooth in left valve, and located between right nymph and socket corresponding to left posterior cardinal tooth (Fig. 6: ps). Anterior lateral (al) and posterior lateral (pl) teeth present in right valve (Fig. 4). Anterior lateral tooth about 1/4 of shell length. Posterior lateral tooth about 1/3 of shell length. Lateral sockets in right valve with same length as respective lateral teeth. Left valve lacking teeth. Sockets reduced appearing as two grooves, shallow, almost inconspicuous (Fig. 3). Posterior groove (pg) ranging from cardinal area to vicinity of adductor muscle scar. Anterior groove (ag) equivalent to one third of posterior groove, ranging to almost half of dorsal anterior margin.

Muscle scar marked shallowly. Anterior and posterior muscles of same size, each one occupying ~1/10 of shell area. Anterior adductor muscle scars rounded anteriorly and weakly concave posteriorly. Posterior adductor muscle scars oval, acute on dorsal side. Dorso-ventral ridge appearing as weak elevation alongside shell axial line, ranging from infra-umbonal region to ventral pallial line. Pallial line distant 1/5 of height of shell from ventral edge. Deflection inside of shell (ventral pallial deflection Fig. 4: vd), located between axial line and siphonal gape, with length about 1/3 of pallial line. Pallial sinus moderately wide, forming an arch, ca. 1/3 of entire valve, ranging up to half shell; widest part of pallial sinus mostly posterior. Pallial sinus elliptical, with a length longer than height; anterior part rounded; ventral part confluent with pallial line. Cruciform muscle scars not impressed.

Measurements (in mm, n=4) Length: 6.20–6.65–6.88. Height: 3.63–4.05–4.17. Holotype: 6.88 by 4.11.

Distribution Brazil, Pará State, Amazon River mouth.



Figures 1–7 *Ervilia asymmetrica* shell. 1,3) Holotype MZUSP 96885. 1 left valve, external view, 3 internal view. 2) paratype MZSP 96886, right valve, external view. 4,5,6) paratype MZSP 96887. 4 right valve, internal view, showing pallial sinus scar, 5 detail of micro-ornamentation, with nodes at tip of the ribs (white arrow), 6 detail of the right hinge, showing the cardinal teeth. 7) paratype MZUSP 96888, detail of left hinge, showing the cardinal teeth. Abbreviations: ac anterior cardinal teeth; ag anterior groove; al anterior lateral tooth; as anterior cardinal socket; mc median cardinal tooth; ms median cardinal socket; n nymph; pc posterior cardinal teeth; pg posterior groove; pl posterior lateral tooth; ps posterior cardinal socket; re resiliifer; vd ventral pallial deflection. All scale bars = 1 mm.

Habitat Muddy to carbonate sand, in continental shelf in about 40 m depth.

Etymology The specific epithet is Latin, and refers to unequal position, with the umbo closer to the anterior margin than posterior.

DISCUSSION

Ervilia asymmetrica has all the features currently considered typical in this genus, in the general ellipsoidal shape, the distribution of hinge teeth, the deflection of the ventral pallial line, and the

presence of an internal and external ligament. This kind of ligament is a characteristic that places *Ervilia* in the Semelidae (Morton & Scott, 1990). All characters relating to the interior surface of the valves, such as the shape of the pallial line, scars of adductor musculature and hinge teeth, are similar to other representatives of the genus.

The cardinals in *E. asymmetrica* consist of three teeth in both valves, a median cardinal tooth and two lateral cardinal teeth, anterior and posterior respectively. The right cardinal median tooth is bifid and thicker than the left cardinal median tooth. There is confusion in the literature about the terminology of cardinal hinge teeth in *Ervilia*. *Ervilia* has been described as having only one cardinal tooth in each valve by some authors (Montagu, 1808; Dall, 1895; Cox *et al.*, 1969; Rooij-Schuilting, 1972), although others have not mentioned the hinge teeth (Gould, 1861; Rehder, 1943). Montagu (1808) considered that there is only one cardinal tooth in the hinge in *E. nitens*, arranged in a cleft, while only “two slight elevations” in the left valve, arranged laterally of the cardinal tooth. Turton (1822), in the genus definition, pointed out the existence of a “single tooth accompanied by two obsolete teeth”. For Davis (1973) there is only one real cardinal tooth, present in the right valve, while only two projections (= elevations) are present embracing the chondrophore (resilifer) in the left valve. But most authors overlooked the existence of such projections or lateral elevations (e.g. Davis, 1967; Rooij-Schuilting, 1972, 1973), considering the existence of a single tooth only. Morton (1990; see also Moreno, 1998) recognized the existence of three teeth in the left valve and corresponding right valve, but did not recognize a bifid median cardinal tooth. *E. castanea* (Montagu 1803) and *E. nitens* is considered to lack a bifid right cardinal tooth, though this is thicker than the equivalent left cardinal tooth (Morton & Scott, 1990). However, some specimens of *E. nitens* in the Brazilian coast have the right cardinal tooth bifid (pers. obs.), showing some variation in the character. Since the positioning of *Ervilia* within the order Tellinoidea (Morton & Scott, 1990), the hinge teeth characteristics of *E. asymmetrica* can be considered homologous to the other Tellinoidea hinge teeth.

The western Atlantic *Ervilia* representatives have been divided into two morphological

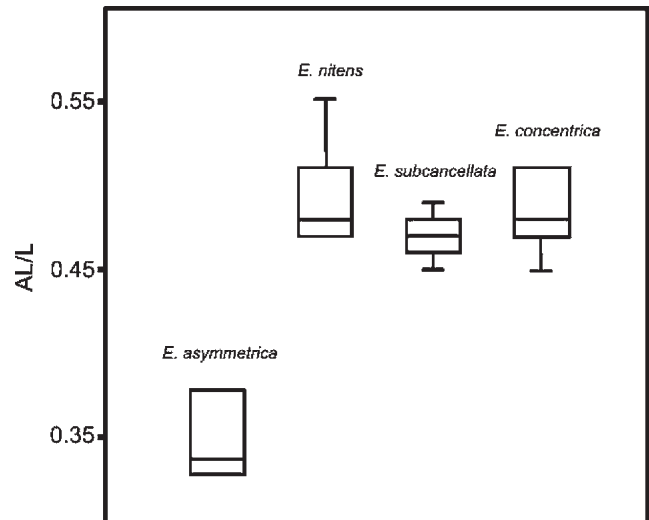


Figure 8 Boxplot showing anterior length/entire length ratio (AL/L) in Western Atlantic *Ervilia* representatives. (*E. asymmetrica* n=4, *E. Nitens* n=32, *E. concentrica* n=20, *E. subcancellata* n=20).

groups: “*E. nitens* group” (represented by *E. nitens*, *E. maculosa* Dall 1896 = *E. concentrica* and some forms assigned to the *E. concentrica*) showing mostly ovate shape, pronounced umbo, convex dorsal and anterior margins, inconspicuous radial sculpture; “*E. concentrica* group” (represented by *E. concentrica*, *E. subcancellata* Smith 1885, *E. rostratula* Rehder 1941 = *E. subcancellata*), showing trigonal shape, internal median ridge, radial sculpture distributed across the surface of the shell and less variation in colour (Rooij-Schuilting, 1972). *E. asymmetrica* has some features that place it in the “*E. concentrica*” group, for instance in the presence of a trigonal shape, pronounced umbo and in the presence of an internal median ridge. However the trigonal shape is less pronounced than in *E. concentrica* and in *E. subcancellata*. The internal median ridge of *E. asymmetrica* is less developed, almost inconspicuous, compared to those species. The posterior radial sculpture reaching almost half of the valve length of *E. asymmetrica* is similar to that of *E. subcancellata*, but less developed than in *E. nitens* and *E. concentrica*. Thus, *E. asymmetrica* is distinguishable from all other species of *Ervilia* in the Western Atlantic based on two characters, the more elongate form, length being about twice height, and the low anterior length/entire length ratio (Fig. 8), with the umbo closer to the anterior margin than the posterior. This is a unique feature of *E. asymmetrica* among the representatives

of the genus *Ervilia*. It is interesting to emphasize that the examined specimens from other species are of equivalent size of those of the new species.

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