ISSN 0738-9388

Volume: 49 THE FESTIVUS ISSUE 4

Replacement name for *Marginella puniceus* S.G. Veldsman, 2014: *Marginella* (*Piperamarginella*) *jeffreysbayensis*

Stephan G. Veldsman
Institute for Marine and Environmental Science, Pretoria, South Africa
conus@enviromarine.co.za

ABSTRACT A replacement or substitute name is given for *Marginella puniceus* S.G. Veldsman, 2014, as *Marginella* (*Piperamarginella*) *jeffreysbayensis* to correct a nomenclatural error which led the original name to be invalid under the International Code of Zoological Nomenclature.

KEYWORDS *Marginella*, *puniceus, jeffreysbayensis, nomen novum,* East Coast Province, South Africa.

INTRODUCTION

Puniceus, -a, -um is a Latin adjective meaning purple. Because the grammatical gender of *Marginella* is feminine, the name *Marginella puniceus* S.G.Veldsman, 2014 must, under Article 31.2 and 34.2 of the International Code of Zoological Nomenclature, be corrected to *Marginella punicea*. Laseron (1948:38, plate 5 figure 7) described from New South Wales *Marginella punicea* Laseron, 1948. Although this is now considered a synonym of *Gibberula agapeta* (R.B. Watson, 1886), *Marginella punicea* Laseron, 1948 and *Marginella punicea* S.G.Veldsman, 2014 are primary homonyms, and under Article 57.2 the latter name is permanently invalid. (personal communication, Philippe Bouchet, 2017).

New substitute name. Under Article 60.3, the name *Marginella jeffreysbayensis* is here established as a *nomen novum* for *Marginella punicea* S.G.Veldsman, 2014, non Laseron, 1948. (*see* Figure 1) This species is a member of the newly established subgenus *Piperamarginella* S.G.Veldsman, 2017.

Etymology. This species is named for the shelling town of Jeffreys Bay, subsequently also where most of the known specimens have been found.

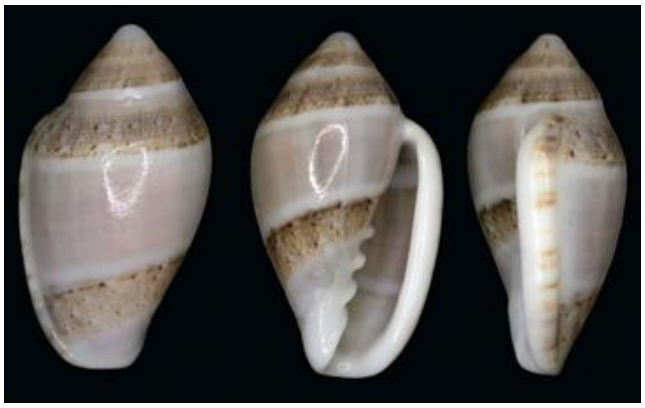


Figure 1. Holotype of *Marginella jeffreysbayensis*. 14.15 mm in length. Natal Museun South Africa, NMSA W9713/T3899.

REFERENCES

Laseron, C.F. 1948. New South Wales Marginellidae. Records of the Australian Museum. 22(1):35-48, plates 5-6.

Veldsman, S.G. 2014. Description of a new *Marginella* Lamarck, 1799: *Marginella puniceus* from the Eastern Cape, South Africa. Malacologia, Mostra Mondiale, 83:22-24.

Veldsman, S.G. 2017. Taxonomic reclassification of the genus *Marginella* Lamarck, 1799 and description of new subgenera (Neogastropoda: Marginellidae). Visaya, Suppl. 9:5-46.

ISSN 0738-9388

Volume: 49 THE FESTIVUS ISSUE 4

Shipworms from Venezuela (Mollusca, Bivalvia, Teredinidae): an updated survey

Marcel Velásquez [1], J. Reuben Shipway [2], Carlos Lira [3], Juan Capelo [4], and Samuel Narciso [5]

[1] Muséum National d'Histoire Naturelle, Sorbonne Universités, 43 Rue Cuvier, F-75231 Paris, France. marcelvelasquez2@gmail.com
[2] Ocean Genome Legacy, Marine Science Center, Northeastern University, Nahant, Massachusetts 01908 (USA). reuben.shipway@gmail.com
[3] Universidad de Oriente, Núcleo Nueva Esparta, Isla de Margarita, Venezuela. Apartado Postal 658, Porlamar 6301, Isla de Margarita, Venezuela.
[4] Departamento de Biología Marina. Estación de Investigaciones Marinas de Margarita. Fundación La Salle de Ciencias Naturales, Porlamar 6301, Isla de Margarita, Venezuela.
[5] Centro de Investigación y Atención Comunitaria (CIAC) de la Fundación para la Defensa de la Naturaleza (FUDENA), Calle Carabobo s/n, Chichiriviche, Falcón, Venezuela.

ABSTRACT This study provides the first comprehensive survey of wood-boring bivalves from the family Teredinidae in Venezuelan coastal waters. Surveys were carried out between 2004 and 2014 and a total of fifteen species from seven genera are reported, including three new records for Venezuelan coastal waters (*Teredo johnsoni, Lyrodus bipartitus*) and one new record for the Caribbean Sea (*Nausitora dunlopei*). A previously reported species (*Bankia martensi*), typically thought to be restricted to cooler southern waters, was not found in this extensive survey and is highlighted as an incorrect record and species misidentification. The diversity of wood-boring bivalves in Venezuelan waters represents one of the highest diversities outside the Indo-Pacific region. Descriptive information for each species is provided, including taxonomic and/or ecological notes. In addition, images of the pallets - the primary taxonomic character for species identification - are provided and compared with specimens from malacological collection at the Harvard Museum of Comparative Zoology (Cambridge, Massachusetts, USA) to corroborate identification.

KEY WORDS Biodiversity, Caribbean Sea, Venezuela, Wood-borers, shipworms, Teredinidae.

INTRODUCTION

The family Teredinidae, commonly known as shipworms, are highly specialized bivalves adapted for boring into and eating wood (Turner, 1966; Nair & Saraswathy, 1971; O'Connor *et al.,* 2014). As such, this group has become notorious for the damage they cause to man-made wooden coastal structures around the globe, which is estimated to cost billions of dollars per annum (Distel *et al*., 2011). However, this anthropocentric view often overlooks the important ecological roles these organisms play (Turner 1966; Distel, 2003; Hendy *et al*., 2013). At present, there are over 70 well described species across fifteen genera (Turner, 1966; Turner, 1971; MacIntosh, 2012; Shipway *et al.*, 2016) widely distributed along temperate and tropical waters, from brackish to marine waters (Turner, 1966; Nair and Saraswathy, 1971).

Shipworms are considered one of the most difficult groups of bivalves to identify (Turner, 1966) and the taxonomy remains challenging despite modern phylogenetic methods (Santos *et al.*, 2005; Distel *et al.*, 2011; Huber, 2015; Shipway *et al.*, 2016). Identification is primarily based on the calcareous features of the pallets,

paddle-like structures which are used to plug the entrance to the calcareous burrows and are a feature unique to the family. However, the pallets often display significant intra-specific variation (Borges *et al.*, 2012) making identification challenging. This, combined with a cryptic and ephemeral life-style within wood, means few surveys have been conducted for this group and shipworm biodiversity is often under-represented and over-looked.

Records on shipworm biodiversity in Venezuela are scarce and mostly restricted to monographs or general surveys of the West Atlantic, Caribbean Sea, and Eastern Pacific taxa (Bartsch, 1931; Clench and Turner, 1946; Turner and Brown, 1953; Turner, 1954; 1955; 1966), or from general malacological surveys of Venezuela (Princz *et al.*, 1981; Ewald *et al*., 1984; Capelo *et al.*, 2009). The single study of teredinid biodiversity in Venezuela only surveyed the Gulf of Cariaco (Nair, 1975). Recently, established populations of *Spathoteredo spatha and Teredo clappi* were found around Margarita Island (Velásquez and López, 2015; Velásquez and López, 2016), constituting new species records for Venezuela. These new findings suggests a hidden biodiversity of wood-boring Teredinidae in the region, highlighting the importance of a new surveys.

In this context, a considerable collection of teredinids were gathered between 2004 and 2014. Part of the material originates from field trips carried out along Venezuela coastal waters at Marcacaibo Lake, Puerto Cabello, Puerto La Cruz, Morrocoy National Park and Margarita Island. Additional samples were obtained from the Orinoco Delta in December 2002, during the Aquatic biodiversity expedition (AquaRAP), of the Conservation International–ConocoPhillips Venezuela and La Salle Natural Sciences Foundation (FLASA) (see Lasso *et al*. 2004).

In this study, we provide the first comprehensive survey of wood-boring bivalves from the family Teredinidae in Venezuelan coastal waters. Herein, we integrate data from extensive field surveys over a ten-year period across the east and west coasts of Venezuela, with an exhaustive search of primary literature. Furthermore, specimens from this survey were directly compared with material from the Ruth Turner Teredinid collection at the Harvard Museum of Comparative Zoology, the world's largest and most complete collection of wood-boring bivalves. The information compiled provides a reviewed and updated checklist of species distribution, new geographical data, and relevant taxonomic commentaries.

MATERIALS AND METHODS

Specimens were collected from a variety of locations along the Venezuelan coast during the years 2004 to 2014 and collections sites are shown in Figures 1-3. Bored wood was collected by SCUBA diving or snorkeling at depths between 1-10 meters. Samples were then stored in plastic bags and buckets and transported to the laboratory. Specimens were then extracted from the wood and preserved in > 96% ethanol. Specimens were identified to the lowest taxonomic-level possible using the illustrations and catalogue of Turner (1966, 1971). All identifications were verified by comparison with the Turner collection at the Harvard Museum of Comparative Zoology (MCZ), Cambridge, Massachusetts (comparative material). Voucher specimen were deposited at the Malacological Collections of Fundación para la Defensa de la Naturaleza (FUDENA), Chichiriviche and the Museum Hno. Benigno Román-Malacology Collection (MOBR), Margarita Island. The registration codes are indicated by CFPNM and MOBR-M- followed by the catalogue number.

The pallets - the primary taxonomy character used for teredinid identification were imaged for all species in this survey, apart from *Bankia*

destructa, *B. goudli* and *Teredo johnsoni*. For direct comparison with our material and to aid future surveys, we also provide descriptive information and images of the pallets from all Venezuelan teredinid species historically identified in the literature, by analysing specimens in the Ruth Turner teredinid collection at the MCZ..

RESULTS

Historically, 21 species of teredinid from eight genera have been recorded in Venezuelan waters. In this survey, we collected 15 species from 12 locations across the Venezuelan coast over a 10 year period. Three species, *Lyrodus bipartitus*, *Teredo johnsoni* and *Nausitora dunlopei*, are new records for the country and the latter a new record for the Caribbean Sea. A further five species (*Bankia fimbriatula, B. fosteri, B. martensi, Nausitora fusticula* and *Lyrodus floridanus*) have been previously recorded in the literature, but were not found in this survey.

Family Teredinidae Rafinesque, 1815
Subfamily Bankiinae Turner, 1966
Genus *Bankia* Gray, 1842

Bankia destructa Clench and Turner, 1946
(Figures 4-5)

Bankia destructa Clench and Turner, 1946
Diagnosis. Pallets elongated with separated cup-shaped segments. Periostracal ridge of the segments serrated. Serrations on outer face fine, on inner longer and coarser. Segments with short serrated awns. Siphons separated.
Material examined. PPL-MI, 1 specimen, collected on roots of *Rizophora mangle* (MOBR-M-3936). PPL-MI, 1 specimen, collected on roots of *R. mangle* (MOBR-M-3937). PPL-MI, 1 spec collected on roots of *R. mangle* (MOBR-M-3938). PPL-MI, 1 specimen collected on roots of *R. mangle* (MOBR-M-3981). EG-MI, 1 specimen collected on roots of *R. mangle* (MOBR-M-3982). IBZ-MNP, 2 specimens collected from sunken wood of *R. mangle* (CFPNM-004732).
Comparative material. Honduras (MCZ-122875); Panama (MCZ- 173994); Colombia (MCZ-123422).
Distribution. Pacific coast of Colombia (Cantera, 2010); Venezuela (Puerto Cabello and Amuay Bay: Clench and Turner, 1946); Brazil (Junqueira *et al.*, 1991; Barreto *et al.*, 2000).
Remarks: This is the first record of this species for Morrocoy National Park.

Bankia campanellata Moll and Roch, 1931
(Figure 6)

Teredo campanulata Sowerby, 1875, non Jeffreys, 1860; *Bankia katherinae* Clench and Turner, 1946; *Bankia bengalensis* Nair, 1954
Diagnosis. Pallets long and slender, composed of distinct, well-spaced bell-shape, campanellate, segments built on a stalk.
Material examined. EG-MI, 3 specimens collected from roots of mangrove (*Rizophora mangle*) (MOBR-M-4008).
Comparative material. Honduras (MCZ-122912); Panama (MCZ-173926); Colombia (MCZ-123414).
Distribution. Venezuela: Amuay Bay (Turner and Brown, 1953), Gulf of Cariaco (Nair, 1979); Brazil (Junqueira *et al.* 1991; Barreto *et al*., 2000); India (Turner, 1966); Malaysia (Singh and Sasekumar, 1994).
Remarks. The first record of this species for Venezuela (as *B. katherinae*) was by Turner and Brown (1953), based on specimens collected in Amuay Bay. Here *B. campanellata*, is also recorded for Margarita Island for the first time.

Bankia carinata J.E. Gray, 1827
(Figure 7)

Teredo carinata J.E. Gray, 1827; *Bankia stutchburyi* Blainville, 1828. For the complete list of synonyms see Turner (1966).

Diagnosis. Pallets with non-serrated segments on margins; funnel-shaped segments moderately separated. Horns short and wide projected outwardly away from the upper segment. Embryonic segments stacked in a compact plate-shaped end. Periostracal margin on inner and outer faces about equal.
Material examined. PPL-MI, 1 specimen collected on roots of *Rizophora mangle* (MOBR-M- 3983). EG-MI, 2 specimens collected on roots of *R. mangle* (MOBR-M-4010).
Comparative material. Puerto Rico (MCZ-351691); Cuba (MCZ- 121533); Honduras (MCZ- 122904); Panama (MCZ- 351682); Colombia (MCZ-122503).
Distribution. Japan (Turner, 1966); Mediterranean Sea (Borges *et al.*, 2014a); Gulf of Mexico (Turgeon *et al.*, 2009); Caribbean Sea (Turner, 1966). Venezuela, Gulf of Cariaco (Nair, 1979) and Gulf of Mexico (Turner, 1966); Tobago (Distel *et al.*, 2011).
Remarks. This is the first record of this species for Margarita Island. In *B. carinata,* pallet segmentation is only observed in adult individuals. The pallets of young individuals often resemble the pallets of *Lyrodus pedicellatus* complex (Turner, 1966).

Bankia gouldi (Bartsch, 1908)
(Figures 8-9)

Xylotrya gouldi, 1908; *Bankia mexicana* Bartsch, 1921; *Bankia* (*Banliella*) *mexicana* Bartsch, 1921; *Bankia schrencki* Moll, 1935.
Diagnosis. Pallets composed of numerous segments on a long stalk, segments cone-shaped without serrations on the margins. Cones broadly triangular, with smooth, drawn-out edges, lateral margins extended into fine short awns. Periostracal margin on the inner face forming web connecting awns; narrow periostracal margin of outer face with short longitudinal striations.
Material examined. PPL-MI, 1 specimen collected on roots of *Rizophora mangle* (MOBR-M-3939).
Comparative material. Colombia (MCZ-122502); Jamaica (MCZ-122730); Honduras (MCZ-121899).
Distribution. Gulf of Mexico (Turgeon *et al*., 2009); Caribbean Sea: Venezuela, Maracaibo Lake (Ewald *et al.*, 1984), Amuay Bay (Turner and Brown, 1953), Gulf of Cariaco (Nair, 1979); Western Atlantic: New Jersey, USA to Brazil (Díaz and Puyana, 1994; Junqueira *et al.*, 1991; Varotto and Barreto, 1998). North Eastern Pacific Coast (Tuner, 1966; Coan and Valentich-Scott, 2012; Cruz *et al.*, 1989).
Remarks. This is the first record of this species for Margarita Island.

Bankia fimbriatula Moll and Roch, 1931
(Figures 10-11)

Teredo fimbriata Jeffreys, 1860, non Defrance, 1828; *Xylotrya fimbriata* Jeffreys, 1860; *Bankia canalis* Bartsch, 1944.
Distribution. Pacific coast of Colombia (Cantera, 2010); Gulf of Mexico (Turgeon *et al.*, 2009); Venezuela (Amuay Bay: Turner and Brown, 1953; Gulf of Cariaco: Nair, 1979; Maracaibo Lake: Rojas and Severeyn, 2000); Brazil (Junqueira et al., 1991; Varotto and Barreto, 1989; Barreto e*t al.*, 2000; Lima *et al.*, 2005; Martins-Silva and Narchi, 2008).
Remarks. No material of this species was found.

Bankia fosteri Clench and Turner, 1946
(Figures 12-13)

Bankia fosteri Clench and Turner, 1946.
Distribution. Colombia (Santa Marta: Clench and Turner, 1946); Venezuela (Gulf of Cariaco and Turpialito: Nair, 1975).
Remarks. No material of this species was found. Nair (1975) mentioned that this is a common species in the Gulf of Cariaco and it is widely distributed throughout the Caribbean Sea.

Bankia martensi (Stempell, 1899)

Teredo (*Xylotrya*) *martensi* Stempell, 1899; *Xylotrya capensis* Calman, 1920; *Bankia* (*Bankia*) *chiloensis* Bartsch, 1924 (Chiloé); *Bankia odhneri* Roch, 1931; *Bankia valparaisensis* Roch and Moll, 1935; *Bankia argentinica* (Moll, 1935).
Distribution. Caribbean Sea (Nair, 1974): Venezuela (Nair, 1974); South America (West and East coast); Africa (East coast); Madagascar; Red Sea; Persian Gulf (Turner, 1966).
Remarks. This species has yet to be recorded in the Caribbean Sea, however Nair (1974) found it from the Gulf of Cariaco, Venezuela. We did not find this species in our survey. *Bankia martensi* is distributed principally in cool and temperate waters and in South America it has been reported from Valparaíso, Chile to Tierra del Fuego, Chile (Turner, 1966). We therefore suggest that the report of Nair (1974) likely constitutes a species misidentification.

Genus *Nausitora* Wright, 1864

Nausitora dunlopei Wright, 1864
(Figures 14-15)

Nausitora dunlopei Wright, 1864**;** *Calobates fluviatilis* Hedley, 1898; *Bankia smithi* Bartsch, 1927. For the complete list of synonyms for this species, see Turner (1966).
Diagnosis. Pallets with fused cone-like elements of the blade are very closely arranged with a central cylindrical stalk. Periostracum brown in colour, covering the blade until the middle of the stalk. On the basal portion of the blade, perisotracal covering is seen extending as little awns.
Material examined. GCM-OD, 3 specimens collected on roots of *Rizophora mangle* (MOBR-M-4011).
Comparative material. Philippines (MCZ-350932); Australia (MCZ-350663); New Guinea (MCZ-350911).
Distribution. Queensland, Australia, India, Thailand, Fiji Islands, Bismarck Archipelago, Madagascar, Philippines (Turner, 1966); Buenaventura Bay, Pacific coast of Colombia (Sandoval *et al.*, 1995).
Remarks.: This is a new record for the Caribbean Sea. The specimens showed similarities with the comparative material at the MCZ and with the illustrations shown in Turner (1966). However, the specimens encountered here lacked the papillose calcareous projections covering the distal portion of blade, a feature which can be found in some individuals of *Nausitora fusticula* (Turner 1966; Turner, 1971).

Nausitora fusticula (Jeffreys, 1860)
(Figures 16-17)

Teredo fusticulus Jeffreys, 1860; *Bankia braziliensis* Bartsch, 1922; *Bankia excolpa* Bartsch, 1922.
Distribution. Gulf of Mexico (Turgeon *et al.*, 2009; Turner 1966); Caribbean Sea (Turner, 1966. Venezuela, Gulf of Cariaco: Nair, 1979); Western Atlantic: Brazil and Uruguay; Eastern Pacific: Panama and Peru (Rios, 1994); Indo-Pacific: India (Estuary of Mahanadi) (Turner, 1966; 1971; Nair and Saraswathy, 1971).
Remarks. No material from this species was found during the current study. The specimens collected by Nair (1979) were found in wood of mangrove *Avicennia* sp in the locality of Punta Ergal, Gulf of Cariaco.

Genus *Nototeredo* Bartsch, 1923

Nototeredo knoxi (Bartsch, 1917)
(Figures 18-19)

Teredo knoxi Bartsch, 1917; *Teredo sigerfoosi* Bartsch, 1922; *Teredo stimpsoni* Bartsch, 1922; *Teredo tryoni* Bartsch, 1922; *Teredo jamaicensis* Bartsch, 1922; *Teredo bisiphites* Roch, 1931; *Teredo congoensis* Roch, 1935; *Teredo digitalis* Roch, 1935; *Teredo rosifolia* Moll, 1941.

Diagnosis. Pallets oval. The outer face of the blade is convex and the inner face is concave. The blade is composed of closely packed segments, separated by thin patches of periostracum. Towards the distal end of the pallet blade closely packed segments appear in concentric rows to form a small, shallow depression. Short stalk. The siphons are united for about one-half their length.
Material examined. EG-MI, 3 specimens collected on roots of *Rizophora mangle* (MOBR-M-4005).
Comparative material. Honduras (MCZ-122883); Jamaica (MCZ-170470); Haiti (MCZ-121487); Santo Domingo (MCZ- 121460); Puerto Rico (MCZ-350565); Colombia (MCZ-278206); Cuba (MCZ-120470); Venezuela (MCZ-357894).
Distribution. Gulf of Mexico (Turgeon *et al.*, 2009); Puerto Rico (Turner and Johnson, 1971); Venezuela (Golf of Cariaco: Nair, 1971); Brazil (Junqueira *et al.*, 1991).
Remarks. When viewed with transmitted light, the pallets of juveniles show a stalk, extending the entire length of the blade, with rib-like segments emanating from it (Nair, 1979).

Genus *Neoteredo* Bartsch, 1920

Neoteredo reynei Bartsch, 1920
(Figures 20-21)

Teredo (*Neoteredo*) *reynei* Bartsch, 1920.
Diagnosis. Pallets unsegmented, large and thick, with a slight indentation at the distal end and a fragment of a brown periostracum remaining; stalk short. Siphons united up to half of their total length.
Material examined. GCM-OD, 1 specimen collected from roots of *Rizophora mangle* (MOBR-M-4007).
Comparative material. Grenada (MCZ-170907).
Distribution. Venezuela (Turner, 1966. Maracaibo Lake: Ewald *et al.*, 1984. Orinoco Delta Capelo *et al*., 2009); Caribbean coast of Colombia (Ahrens *et al.*, 2013); Brazil (Lima *et al.*, 2005); West coast of Africa (Turner, 1966; Rancurel, 1971).
Remarks. This is a species widely distributed along of Maracaibo Lake, Venezuela (Ewald *et al.*, 1984). It is considered a brackish water species much like *Psiloteredo healdi, Nausitora dunlopei*, *N. hedleyi* and *Teredo poculife* (Turner, 1966; Rayner, 1979).

Genus *Psiloteredo* Bartsch, 1922

Psiloteredo healdi Bartsch, 1931
(Figures 22-23)

Teredo healdi Bartsch, 1931.
Diagnosis. Solid blade, thick at the root, decreasing thickness towards the end, distal moderate depression in the outer face. Siphons united except at its end.
Material examined. CMO-OD, 1 specimen collected on roots of *Rizophora mangle* (MBOR-M-4013). CMA-OD, 1 specimen collected on roots of *R. mangle* (MOBR-M-4014). CC-OD, 3 specimens collected on roots of *R. mangle* (MOBR-M-4015).
Comparative material. Bluefields, Nicaragua (MCZ-122638).
Distribution. Costa Rica (Taylor, 1993); Panama (Turner, 1966); Venezuela (Maracaibo Lake: Bartsch 1931; Turner 1966; Ewald *et al.*, 1984; Rojas and Severeyn, 2000); Brazil (Lima *et al.*, 2005).
Remarks. This is the first record of this species from the Orinoco Delta. Recently, Borges (2015) analyzed the internal structure of the pallets of *Psiloteredo megatora* using scanning electron microscopy (SEM), and found evidence of internal segmentation of the pallets of these species. This observation suggests that *P. megatora* and possibly congeners should be relocated into the subfamily Bankiinae.

ISSN 0738-9388

Genus *Spathoteredo* Moll, 1928

Spathoteredo spatha (Jeffreys, 1860)
(Figures 24-25)

Distribution. Western North America, USA (Turgeon, 1998); Gulf of Mexico and Caribbean Sea (Turner, 1966; Velásquez and López, 2015).
Remarks. This species wasn't encountered during the present study. Velásquez and López (2015) found established populations of *Spathoteredo spatha* in Laguna Punta de Piedras, Isla de Margarita, Venezuela this is considered the southern limit of this species in the Caribbean Sea.

Subfamily Teredininae Rafinesque, 1815
Genus *Teredo* Linnaeus, 1758

Teredo furcifera Martens, 1894
(Figure 26)

Teredo parksi Bartsch, 1921; *Teredo furcillatus* Miller, 1924; *Teredo australasiatica* Roch, 1935; *Teredo furcata* Moll, 1935; *Teredo krappei* Moll, 1935; *Teredo laciniata* Roch, 1935; *Teredo bensoni* Edmondson, 1946; *Teredo parksi madrasensis* Nair, 1958.
Diagnosis. The pallet blade features a transverse ridge at its widest point. The distal portion is covered by a dark-brown periostracum, which forms a shallow cup-shaped depression and extends into two lateral horns. The inner and outer pallet faces form U-V shape, which is more prominent on the outer than inner face.
Material examined. LML-MI, 1 specimen collected from sunken wood of *Rizophora mangle* (MOBR-M-3930). LML-MI, 1 specimen collected from sunken wood of *R. mangle* (MOBR-M-3931). LML-MI, 1 specimen collected from sunken wood of *R. mangle* (MOBR-M-3932). EML-MI; 7 specimens collected from sunken wood of *R. mangle* (MOBR-M-3979). EML-MI, 1 specimen collected from sunken wood of *R. mangle* (MOBR-M-3980). IBZ-MNP, 2 specimens collected from sunken wood of *R. mangle* (CFPNM-004736). EG-MI, 10 specimens collected on roots of *R. mangle* (MOBR-M-4006).
Comparative material. Puerto Rico (MCZ-170304); Cuba (MCZ-120396); Honduras (MCZ-121950); Trinidad (MCZ-170919); Panama (MCZ-121523); Haiti (MCZ-121742); Barbados (MCZ-170845); Venezuela (MCZ- 123466).
Distribution. Australia (Brearley *et al*., 2003); New Guinea (Rayner, 1979); Malaysia (Singh and Sasekumar, 1994); India (Turner, 1966); Brazil (Junqueira *et al.*, 1991; Varotto and Barreto, 1998; Barreto *et al.*, 2000); Hawaii (Turner, 1966); Pacific coast of Colombia (Cantera, 2010); Ecuador (Cruz *et al.*, 1987); Venezuela (Gulf of Cariaco: Nair, 1975).
Remarks. This is the first record of this species for Margarita Island.

Teredo bartschi Clapp, 1923
(Figure 27)

Teredo bartschi Clapp, 1923; *Teredo batilliformis* Clapp, 1924; *Teredo balatro* Iredale, 1932; *Teredo shawi* Iredale, 1932; *Teredo aegyptia* Roch, 1935; *Teredo grobbai* Moll, 1937; *Teredo hiloensi*s Edmondson, 1942.
Diagnosis. Blade of the pallets without ridge at mid-point. Inner face of the pallets with U-shaped distal margin, outer face is U to V shaped. Periostracum light golden to dark brown, extending beyond calcareous portion to form small lateral horns.
Material examined. IBZ-MNP, 2 specimens collected from sunken wood of *Rizophora mangle* (CFPNM-004735).
Comparative material. Santo Domingo (MCZ-121259); Puerto Rico (MCZ-170947) Panama (MCZ- 121119).
Distribution. Red Sea (Cragg *et al.*, 2009), Malaysia (Singh and Sasekumar, 1994); Persian Gulf (Turner, 1966), Australia (Brearley *et al.*, 2003), Pacific coast of Colombia (Cantera, 2010);

Ecuador (Cruz *et al.*, 1987); Gulf of Mexico (Turgeon *et al*., 2009; Turner, 1966); Caribbean Sea (Turner, 1966); Brazil (Barreto *et al.*, 2000); Venezuela (Turpialito, Gulf of Cariaco: Nair, 1975).
Remarks. Thought to be restricted to tropical waters until Borges *et al*. (2014b) reported the species in the subtropical waters off Turkey and cold eastern Atlantic water off the coast of Portugal.

Teredo clappi Bartsch, 1923
(Figures 28-29)

Diagnosis. Blade of the pallets has a cup-shaped, red-brown periostracum, which covers the distal half of the solid calcareous blade. A white thin calcareous layer cover the internal face of the pallets. Stalk with smooth curvature and with a slight division near the base of the blade. The siphons are united only at the base.
Material examined. LML-MI, 1 specimen collected from sunken wood of *Rizophora mangle* (MOBR-M-3929). EG-MI, 12 specimens collected on roots of *R. mangle* (MOBR-M-4009).
Distribution. In tropical and subtropical waters (Turner, 1966; Velásquez and López, 2015).
Remarks. Recently, Velásquez and López (2016) confirmed the presence of this species at Laguna El Morro, Isla Margarita.

Teredo johnsoni Clapp, 1924
(Figures 30-31)

Diagnosis. Pallets with long white stalks. The blade about as wide as long, covered with a dark-brown periostracum, the outer face convex and the inner face flat, the distal portion divided in two cups.
Material examined. IBZ-MNP, 5 specimens collected from sunken wood of *Rizophora mangle* (CFPNM-004731).
Comparative material. Puerto Rico (MCZ-350503); Cuba (MCZ-121030); Panama (MCZ-121610).
Distribution. Australia (MacIntosh *et al*., 2012); Malaysia (Singh and Sasekumar, 1994); New Guinea (Rayner, 1979; 1983).
Remarks. This is the first record for Venezuela.

Genus *Lyrodus* Gould, 1870

Lyrodus pedicellatus (de Quatrefages, 1849)
(Figures 32-33)

Teredo pedicellata Quatrefages, 1849; *Teredo pedicellata var. truncata* Jeffreys, 1865; *Teredo chlorotica* Gould, 1870. For the complete list of synonyms for this species, *see* Turner (1966).
Diagnosis. Shell valves feature numerous, closely set ridges. Pallets partially covered by a brown-blackish horny periostracal structure, commonly deeply excavated at the tip.
Material examined. LML-MI, 5 specimens collected from sunken wood of *Rizophora mangle* (MOBR-M-3978). PCB, 15 individuals found in driftwood. PLC, 6 specimens found in driftwood.
Comparative material. Santo Domingo (MCZ-121363); Puerto Rico (MCZ-349670); Haiti (MCZ-121484); Cuba (MCZ-170942); Honduras (MCZ-121960); Costa Rica (MCZ-122490); Panama (MCZ-123558); Colombia (MCZ-122497); Venezuela (MCZ-123328); Trinidad (MCZ-170941).
Distribution. Cosmopolitan distribution (Turner 1966; Abbott, 1974).
Remarks. This is the first record of this species from Isla Margarita. The previous record of this species in Venezuela is from the Gulf of Cariaco (Nair, 1979). *Lyrodus pedicellatus* is morphologically identical to *L. floridanus* and these species cannot be distinguished based on traditional morphological features (Calloway and Turner, 1983). However, these species display different brooding strategies, with *L. floridanus* recorded as a short-term brooder, whereas *L.*

pedicellatus is a long-term brooder (Calloway and Turner, 1983). A molecular phylogeny of European teredinids revealed the existence of two distinct clades for *Lyrodus pedicellatus* from Atlantic and Mediterranean (Borges *et al.*, 2012). Established populations of both lineages of *Lyrodus pedicellatus* have been mentioned occurring in European waters (Borges *et al.*, 2014a).

Lyrodus floridanus (Bartsch, 1922)

Teredo floridana Bartsch, 1922
Distribution. Gulf of Mexico (Turgeon *et al.*, 2009); Brazil (Junqueira *et al.*, 1991; Varotto and Barreto, 1998).
Remarks. No material for this species was found. This species was previously reported in Maracaibo Lake (Ewald *et al.*, 1984).

Lyrodus massa (Lamy, 1923)
(Figures 34-35)

Teredo massa Lamy, 1923; *Teredo infundibulata* Roch, 1935; *Teredo singaporeana* Roch, 1935.
Diagnosis. Calcareous plates with two overlapping cones. Cup base of triangle-shape. Periostracum as separate conical cup, inserted into calcareous base. Periostracum colour varying from light golden brown to dark red-brown or nearly black. Stalk short and straight. Siphons are united up to the median part.
Material examined. IBZ-MNP, 2 specimens collected from sunken wood of *Rizophora mangle* (CFPNM-004734). EG-MI, 5 specimens collected on roots of *R. mangle* (MOBR-M-4004).
Comparative material. Panama (MCZ-122393); Honduras (MCZ-227271); Cuba (MCZ-122801); Puerto Rico (MCZ-349724); Colombia (MCZ-122544).
Distribution. Caribbean Sea (Turner, 1966); Brazil (Junqueira *et al.*, 1991; Varotto and Barreto, 1998; Barreto *et al.*, 2000); Singapore (Turner, 1966); Philippines (Betcher *et al.*, 2012); Australia (Brearley *et al.*, 2003).
Remarks. Prior to this survey, the only record of *L. massa* in Venezuela was of two single pallets found in a wooden collection panels placed in the Gulf of Cariaco (Nair, 1979). Like *L. pedicellatus* and *L. floridanus* complex, *L. massa* and *L. singaporeana* are also difficult to distinguish morphologically. However, the former broods larvae to the straight-hinged stage, whilst the latter broods to the pediveliger stage (Turner and Calloway, 1987).

Lyrodus bipartitus Jeffreys, 1860
(Figures 36-37)

Teredo bipartita Jeffreys 1860; *Teredo schizoderma* Li, 1965.
Diagnosis. Periostracum as separate conical cup, inserted into calcareous base; periostracum colour varying from light golden brown to dark red-brown or nearly black. Larvae brooded to pediveliger stage.
Material examined. EG-MI, 3 specimens collected on roots of *Rizophora mangle* (MOBR-M-4012).
Comparative material. Panama (MCZ-170573); Puerto Rico (MCZ-280227); Panama (MCZ-349769).
Distribution. Panama (Turner, 1966); United Kingdom (Jeffreys 1860; Turner, 1966); Australia (Turner, 1966).
Remarks. This is the first record of this species for Venezuela.

CONCLUSION

This survey represents the first comprehensive review of teredinid diversity in Venezuelan coastal waters. Previous surveys of the Caribbean Sea and Gulf of Mexico identify a total of twenty-four teredinid species (Abbott, 1974; Turner, 1966; Díaz and Puyana, 1994; Turgeon *et al.*, 2009; Miloslavich *et al.*, 2010), eighteen of which have been previously recorded in

Venezuelan waters (Bartsch, 1931; Clench and Turner, 1946; Turner and Brown, 1953; Turner, 1966; Nair, 1975; Ewald *et al.*, 1984; Lasso *et al.*, 2009; Velásquez and López, 2015; Velásquez and López, 2016). Our findings increase this to twenty-one species across seven different genera, representing one of the highest diversities of wood-borers outside the Indo-Pacific region. This includes three new species records - *Teredo johnsoni*, *Lyrodus bipartitus* and *Nausitora dunlopei* - the latter also a new species record for the Caribbean region. However, *Bankia martensi*, previously reported in the Gulf of Cariaco (Nair, 1974) was not found in this survey. This species is considered restricted to the cold waters of southern south America and South Africa (Turner, 1966), and the report by Nair (1974) likely represents a species misidentification.

ACKNOWLEDGEMENTS

We thank the following people: Julian Mora Day (La Salle Foundation), for providing teredinid samples from the Orinoco Delta; Adam Baldinger (Comparative Zoology Museum of Harvard University); Oscar Diaz (Universidad de Oriente); and, Jesús Hernández (Universidad de Oriente, Núcleo Nueva Esparta).

REFERENCES

Ahrens, M., R. Shipway, S. Caballero, Á. Moncaleano-Niño, A. Luna-Acosta and S.C. Ruiz. 2013. Confirmación molecular de tres especies de bivalvos xilótrofos (Familia Teredinidae) en las bahías de Cartagena y Barbacoas, mar Caribe, Colombia. MUTIS 3(2):6-12.

Barreto, C.C., A.O.R. Junqueira and S.H.G. Silva. 2000. The effect of low salinity on teredinids. Brazilian Archives of Biology and Technology 43(4):399-407.

Bartsch, P. 1931. A new shipworm from Venezuela. Proceedings of the United States National Museum 79(8):1-3.

Betcher M.A., J.M. Fung, A.W. Han, R. O'Connor, R. Seronay, G.P. Concepcion, D.L. Distel and M.G. Haygood. 2012. Microbial distribution and abundance in the digestive system of five shipworms species (Bivalvia: Teredinidae). PLosONe 9:3-10.

Borges, L.M.S. 2015. The internal structure of the pallets of *Nototeredo norvagica* and *Psiloteredo megotara* (Bivalvia: Teredinidae): implications for subfamilial allocations. Zoomorphology 135(1): 33-41.

Borges, L.M., L.M. Merckelbach, I. Sampaio and S.M. Cragg. 2014a. Diversity, environmental requirements, and biogeography of bivalve wood-borers (Teredinidae) in European coastal waters. Frontiers in Zoology 11(1):1-13.

Borges, L.M.S., H. Sivrikaya and S.M. Cragg. 2014b. First records of the warm water shipworm *Teredo bartschi* Clapp, 1923 (Bivalvia, Teredinidae) in Mersin, southern Turkey and in Olhão, Portugal. BioInvasions Records 3(1):25-28.

Borges, L.M.S., H. Sivrikaya, A. le Roux, J.R. Shipway, S.M. Cragg and F.O. Costa. 2012. Investigating the taxonomy and systematics of marine wood borers (Bivalvia : Teredinidae) combining evidence from morphology, DNA barcodes and nuclear locus sequences. Invertebrate Systematics 26:572-582.

Brearley, A., K. Chalermwat and N. Kakhai. 2003. Pholadidae and Teredinidae (Mollusca: Bivalvia) collected from mangrove habitats on the Burrup Peninsula, Western Australia, in Wells, F.E., Walker, D.I. and Jones, D.S. (eds) The Marine Flora and Fauna of Dampier, Western Australia. Western Australian Museum, Perth, 345-362.

Calloway, C.B. and R.D. Turner. 1983. Documentation and implications of rapid successive gametogenic cycles and broods in the shipworm *Lyrodus floridanus* (Bartsch) (Bivalvia, Teredinidae). Journal of Shellfish Research 3:65-69.

Cantera, J.R. 2010. Bivalvos perforadores de Madera (Mollusca : Teredinidae, Pholadidae). Biología Marina 136 (32):277-288.

Capelo, J., J. Buitrago, J. Guitiérrez and R. Martín. 2009. Distribución geográfica de los moluscos marinos y estuarinos en el Golfo de Paria, Delta del Orinoco y la plataforma deltana

(Venezuela). Memoria de la Sociedad de Ciencias Naturales La Salle 171:33-56.

Clench, W. and R. Turner. 1946. The genus *Bankia* in the western Atlantic. Johsonia II (19):1-28.

Coan, E.V. and P. Valentich-Scott. 2012. Bivalve seashells of tropical west America. Marine bivalve mollusks from Baja California to northern Peru. Santa Barbara: Santa Barbara Museum of Natural History 2:1-1258.

Cragg, S.M., M.-C. Jumel F. A. Al-Horani and I.W. Hendy. 2009. The life history characteristics of the wood-boring bivalve *Teredo bartschi* are suited to the elevated salinity, oligotrophic circulation in the Gulf of Aqaba, Red Sea. Journal of Experimental Marine Biology and Ecology 375(1-2):99-105.

Cruz, M., G. Torres and F. Villamar. 1987. Estudio de los Moluscos bivalvos perforadores de la madera *Rhyzophora harrisonii* (Mangle) en la costa Ecuatoriana. Acta Oceanográfica del Pacífico 4(1):122-160.

Cruz, M., G. Torres and F. Villamar. 1989. Estudio comparativo de bivalvos perforadores de las maderas mas resistentes (Laurel, Moral, Palo de Vaca) y la mas atacada (Mangle) en la costa Ecutoriana. Acta Oceanográfica del Pacífico 5(1):49-55.

Díaz, J.M. and M. Puyana. 1994. Moluscos del Caribe Colombiano: Un catálogo ilustrado. Colciencias. Fundación Natura e INVEMAR. Bogotá, Colombia, 367 pp.

Distel, D.L. 2003. The biology of marine wood boring bivalves and their bacterial endosymbionts, *in* Goodell B., Nicholas D.D. and Schultz T.P. (eds), Wood Deterioration and Preservation. American Chemical Society Press, Washington, 253–271.

Ewald, J.J., H. Severeyn and D. Espinoza. 1984. La fauna acuática de invertebrados de la Cuenca del Lago de Maracaibo: I. Los moluscos bivalvos perforadores. Revista científica de la Universidad del Zulia, 1(2):41-64.

Hendy, I., L. Michie and W. Taylor. 2014. Habitat creation and biodiversity maintenance in mangrove forests: teredinid bivalves as ecosystem engineers. PeerJ, 2:e591. http://dx.doi.org/10.7717/peerj.591.

Hendy, I.W., J. Eme, T.F. Dabruzzi, S.M. Cragg and W.A Bennett. 2013. Dartfish use teredinid tunnels in fallen mangrove wood as a low-tide refuge. Marine Ecology Progress Series, 486:237-245.

Jeffreys, J.G. 1860. A synoptical list of the British species of *Teredo* with a notice of the exotic species. Annals and Magazine of Natural History 6(3):121-127.

Junqueira, A.O.R., E.P. Omena and S.H.G. Silva. 1991. A comparative study of the methods used to evaluate the activity of Teredinidae molluscs. Journal of Experimental Marine Biology and Ecology 150(1):107-115.

Lasso, A.A., L.A. Alonso, A.L. Flores and G. Love. 2004. Evaluación rápida de la biodiversidad y aspectos sociales de los ecosistemas acuáticos del delta del río Orinoco y golfo de Paria, Venezuela. Boletín RAP de Evaluación Biológica 37. Conservation International. Washington D.C., USA, 359 pp.

Lima, S.M., C.H. Tagliaro, C.R. Beasley, H. Schneider, I. Sampaio, C.S. Filho and A.C. Müller. 2005. Taxonomic implications of molecular studies on northern Brazilian Teredinidae (Mollusca: Bivalvia) species. Genetics and Molecular Biology 28(1):175-179.

Lodeiros, C., B. Marín and A. Prieto. 1999. Cátalogo de moluscos marinos de las costas nororientales de Venezuela: Clase Bivalvia. Edición Apudons. Cumana, Venezuela, 1-109.

MacIntosh, H., R. de Nys, and S. Whalan. 2012. Shipworms as a model for competition and coexistence in specialized habitats. Marine Ecology Progress Series, 461:95-105.

Martins-Silva, L.I.A., M. Ju and W. Narchi. 2008. Functional anatomy of *Bankia fimbriatula* Moll and Roch, 1931 (Bivalvia: Teredinidae). The Veliger 50(4):309-325.

Nair, N.B. 1975. Shipworms of Venezuela report on a collection from the Gulf of Cariaco. Boletín del Instituto Oceanográfico de Venezuela 14:129-146.

O'Connor, R.M., J.M. Fung, K.H. Sharp, J.S. Benner, C. McClungd, S. Cushingd, E. Lamkine, A. Fomenkovd, B. Henrissatf, Y. Londerd, M. Scholzg, J. Posfaid, S. Malfattih, S. Tringeh, T. Woykeh, R. Malmstromh, D. Coleman-Derrh, M. Altamiai, S. Dedrickj, S.

Kaluziakb, M. Haygoodk, and D. Distel. 2014. Gill bacteria enable a novel digestive strategy in a wood-feeding mollusk. PNAS 111: E5096−E5104.

Rancurel, P. 1971. Les Teredinidae (Mollusques Lamellibranches) dans les lagunes de Cóte d' Ivoire. Memóries of Recherche Science Techenologie Outre-Mer 47:1-235.

Rayner, S.M. 1979. Comparison of the salinity range tolerated by Teredinids (Mollusca: Teredinidae) under controlled conditions with that observed in an estuary in Papua New Guinea. Australian Journal of Marine and Freshwater Research 30:521-523.

Rayner, S.M. 1983. Distribution of teredinids (Mollusca:Teredinidae) in Papua New Guinea. Records of the Australian Museum 35(2):61-76.

Reyes, J., A. Flores-Sánchez, J. Carruyo-Noguera, C. Casler, S. Narciso, M. Nava and A. Guerra-Gómez. 2007. Moluscos gasterópodos y bivalvos de la alta Guajira, Estado Zulia, Venezuela. Boletín del Centro de Investigaciones Biológicas 41(3):376-393.

Rojas, J. and H. Severyn. 2000. Tasa de degradación de madera por el perforador de manglar *Psiloteredo healdi* (Bivalvia: Teredinidae) en el Lago de Maracaibo, Venezuela. Revista de Biología Tropical 48(1):153-158.

Sandoval, F., J.R. Cantera and G. Bolívar. 1995. Bivalvos perforadores de madera en la Bahía de Buenaventura, Pacífico colombiano, *in* Cantera, J.R. and Restrepo J.D. (eds), Delta del Río San Juan - Bahías de Málaga y Buenaventura, Pacífico colombiano, 1:1-337.

Shipway, J.R., R. O'Connor, D. Stein S.M. Cragg, T. Korshunova, A. Martynov, T. Haga and D.L. Distel. 2016. *Zachsia zenkewitschi* (Teredinidae), a rare and unusual seagrass boring bivalve revisited and redescribed. PLOS ONE 11(5): e0155269. doi: 10.1371/journal.pone.015 5269.

Singh, H.R. and A. Sasekumar. 1994. Distribution and abundance of marine wood borers on the west coast of peninsular Malaysia. Hydrobiologia 258:111-121.

Taylor, D.W. 1993. Moluscos dulceacuícolas de Costa Rica: Introducción y lista preliminar. Revista de Biología Tropical 41(3):653-655.

Turgeon, D.D., W.G. Lyons, P. Mikkelsen, G. Rosenberg and F. Moretzsohn. 2009. Bivalvia (Mollusca) of the Gulf of Mexico, *in* Felder, D.L. and Camp D.K. (eds), Gulf of Mexico–Origins, Waters, and Biota. Biodiversity. Texas A and M Press, College Station, 711-744.

Turner R.D. and D.J. Brown. 1953. The genus *Bankia* in the Western Atlantic. Johnsonia 2(32):357-360.

Turner, R.D. 1955. The family Pholadidae in the western Atlantic and the Eastern Pacific, Part II: Martesiinae, Juannetiinae and Xylophaginae. Johnsonia 3:65-100.

Turner, R.D. 1954. The family Pholadidae in the Western Atlantic and the Eastern Pacific, Part I: Pholadinae. Johnsonia 3:1-63.

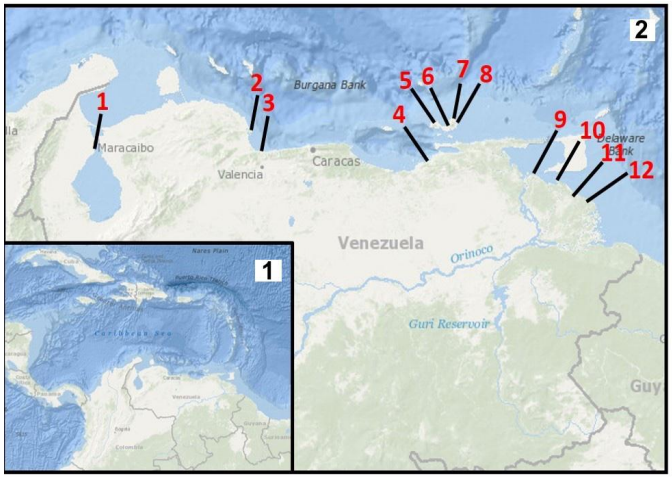
Turner, R.D. 1966. A survey and illustrate catalogue of the Teredinidae (Mollusca: Bivalvia). Museum of Comparative Zoology. Harvard University, Cambridge, 1- 265.

Varotto, R.S. and C.C. Barreto. 1998. Colonization of artificial substrata by teredinid larvae released from a previously infested focus at Ilha Grande Bay. R.J. Brazilian Archives of Biology and Technology 41(4):391-400.

Velásquez, M. and I. López. 2015. First record of *Spathoteredo spatha* (Mollusca: Teredinidae) in Venezuela. Revista Mexicana de Biodiversidad 86:1-3.

Velásquez, M. and I. López. 2016. The presence of *Teredo clappi* (Bivalvia: Teredinidae) in Venezuelan coastal waters. Revista Mexicana de Biodiversidad 87(2):516-518.

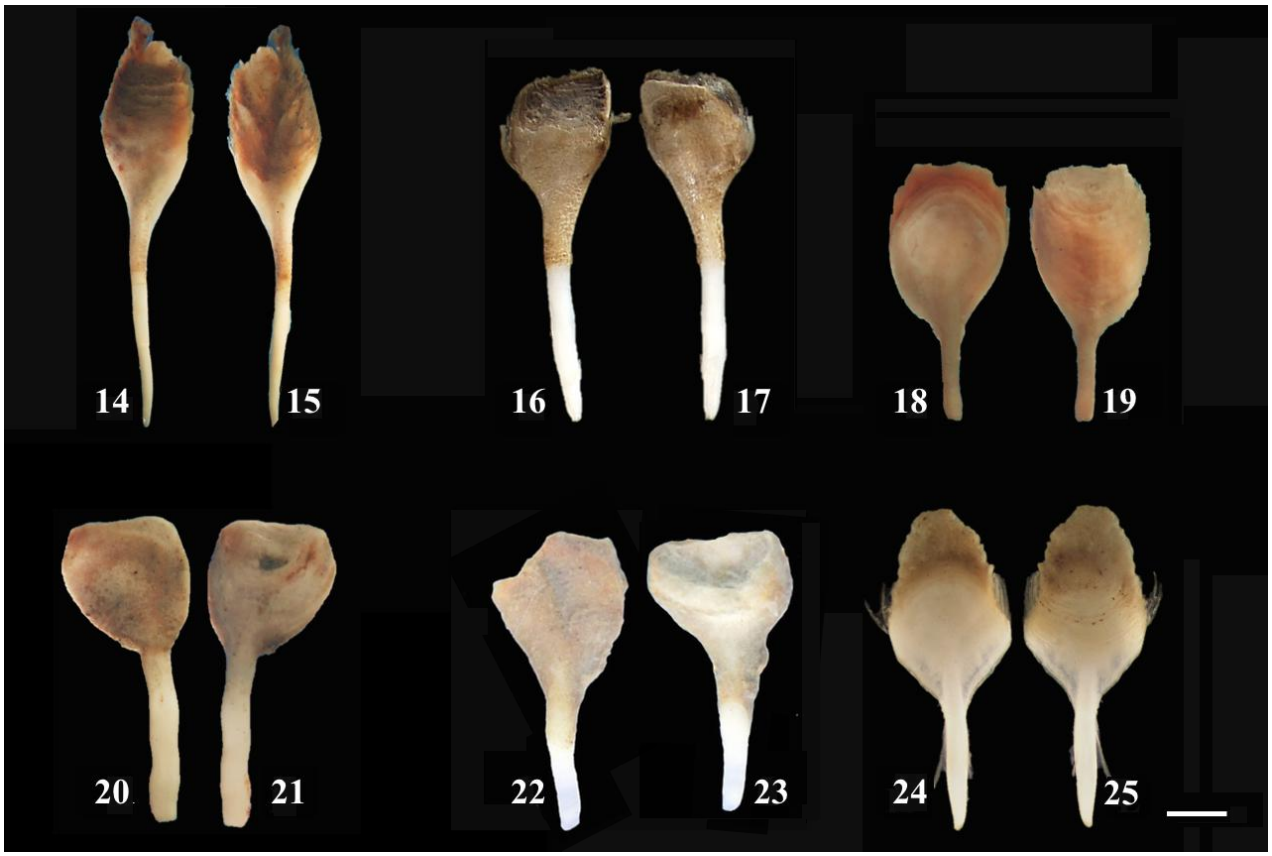
ISSN 0738-9388



Samples sites	Acronym	Coordinate 3
1. Maracaibo Lake	ML	10°37'46"N- 71°31'16"W
2. Isleta Boca e' Zorro, Morrocoy National Park	IBZ-MNP	10°53'42" N- 68°15'31"W
3. Puerto Cabello	PCB	10°29'47"N- 68° 3'37" W
4. Puerto La Cruz	PLC	10°14'28"N- 64°37'13"W
5. Punta de Piedras lagoon, Margarita Island	PPL-MI	10°54'18"N- 64°06'31"W
6. El Guamache, Margarita Island	EG-MI	10°52'19"N- 64°03'14"W
7. Las Marites lagoon, La Isleta, Margarita Island	LML-MI	10°53'45"N- 63°56'04"W
8. El Morro lagoon, Porlamar, Margarita Island	EML-MI	10°57'20"N- 63°49'35"W
9. Güinamorena, Caño Mánamo, Orinoco Delta	GCM-OD	10°52'19"N- 64°03'14"W
10. Caño Macareo, Orinoco Delta	CMA-OD	9° 5'43"N- 61°51'42"W
11. Caño Morocoto, Orinoco Delta	CMO-OD	9°49'46"N- 61°56'39"W
12. Caño Cementerio,Orinoco Delta	CC-OD	9° 3'11"N- 61°16'3"W

Figures 1-3. Location of sampling sites. **1**) Overview of Venezuela and Caribbean Sea. **2**) Enlargment of coastal northern Venezuela detailing field site locations. **3**) Table of field sample sites, including site acronym and site coordinates.

Figures 4-5, *Bankia destructa* (MOBR-M 3981). **6**, *Bankia campanellata* (MOBR-M 4008), outer face of the pallet. **7**, *Bankia carinata* (MOBR-M-4010), outer face of pallet. **8-9**, *Bankia gouldi** (MCZ 138269). **10-11**, *Bankia fimbriatula** (MCZ 1357937). **12-13**, *Bankia fosteri** (MCZ 170974). In pallets pairs is showed the outer (left) and inner (right) face. Species marked with an asterik (*) are from the Harvard Museum of Comparative Zoology. Catalogue numbers are in parentheses. Scale bar = 5 mm.



Figures 14-15, *Nausitora dunlopei* (MOBR-M 4011). **16-17**, *Nausitora fusticula** (MCZ 350705). **18-19**, *Nototeredo knoxi* (MOBR-M 4005). **20-21**, *Neoteredo reynei* (MOBR-M 4007). **22-23**, *Psiloteredo healdi* (MOBR-M 4013). **24-25**, *Spathoteredo spatha** (MCZ 356879). Pallets pairs showed the inner (left) and outer (right) face. Species names with asterik (*) belong to the material from the Harvard Museum of Comparative Zoology. Catalogue numbers are in parentheses. Scale bar = 1 mm.

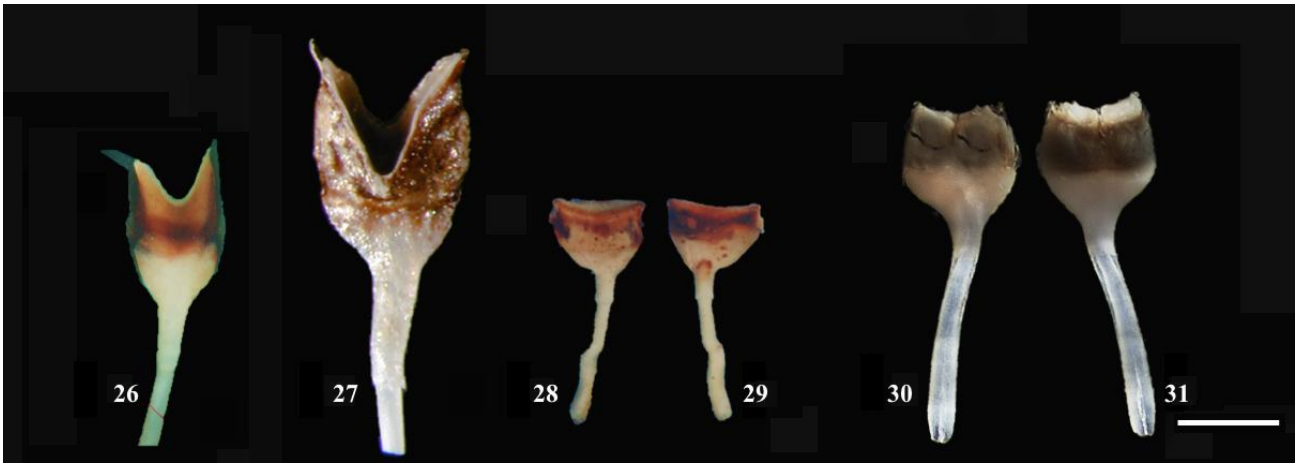
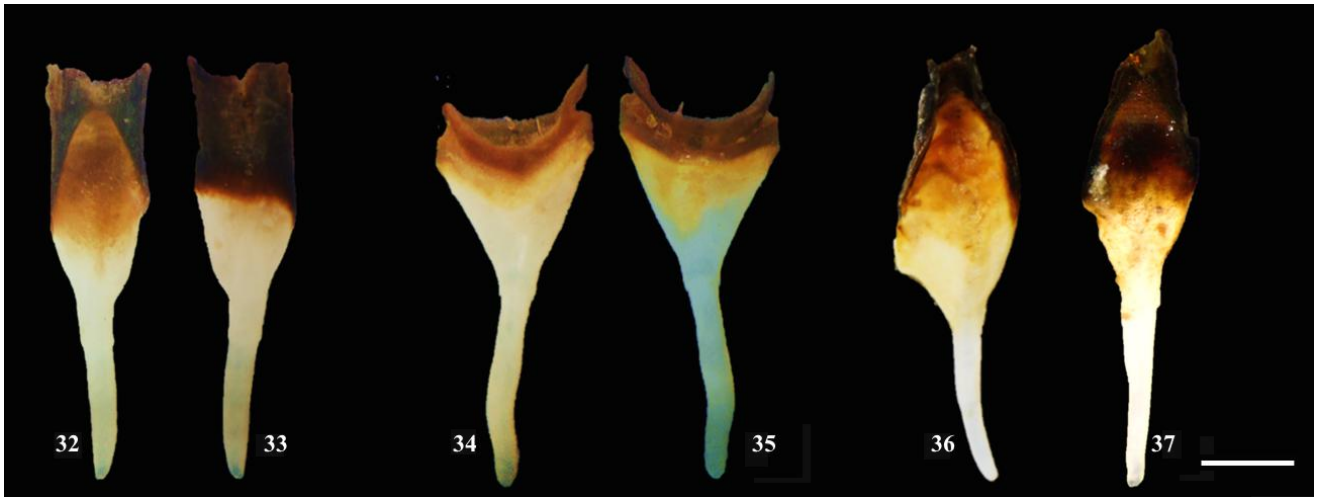


Figure 26, *Teredo furcifera* (MOBR-M 3930), pallet outer face. **27,** *Teredo bartschi* (MOBR-M 4006), pallet pair outer face. **28 29**, *Teredo clappi* (MOBR-M 4009). **30-31,** *Teredo johnsoni** (MCZ 268008). In pallets pairs is showed the inner (left) and outer (right) face. Species names with asterik (*) belong to the material from the Harvard Museum of Comparative Zoology. Catalogue numbers are in parentheses. Scale bar = 1 mm.

ISSN 0738-9388



Figures 32-37. 32-33, *Lyrodus pedicellatus* (MOBR-M-3978). **34-35,** *Lyrodus massa* (MOBR-M 4004). **36-37**, *Lyrodus bipartitus* (MOBR-M 4012). Pairs is showed the inner (left) and outer (right) face. Catalogue numbers are in parentheses. Scale bar = 1 mm.