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SABELLIDAE LATREILLE, 1825 (ANNELIDA, POLYCHAETA) FROM ROCAS ATOLL, BRAZIL, WITH THE DESCRIPTION OF A NEW SPECIES [1]

(With 4 figures)

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ABSTRACT: Three species of sabellids belonging to the genera *Bispira* and *Notaulax* were found in Rocas Atoll, Rio Grande do Norte State (RN), Brazil (3°51'30"S and 33°49'29"W). Among them, *Bispira klautae* is a new species. The description of this new species and a redescription of *B. melanostigma* and *N. occidentalis* are provided.

Key words: Polychaeta. Sabellidae. Rocas Atoll. Brazil. New species.

RESUMO: Sabellidae Latreille, 1825 (Annelida, Polychaeta) do Atol das Rocas, Brasil, com a descrição de uma nova espécie.

Três espécies de sabelídeos pertencentes aos gêneros *Bispira* e *Notaulax* foram encontrados no Atol das Rocas, Rio Grande do Norte (RN), Brasil (3°51'30"S e 33°49'29"W). Dentre estas, uma nova espécie: *Bispira klautae*. Além da descrição desta nova espécie, é fornecida a redescrição de *B. melanostigma* e *N. occidentalis*.

Palavras-chave: Polychaeta. Sabellidae. Atol das Rocas. Brasil. Espécie nova.

INTRODUCTION

After the original description, the first significant subdivision of the Sabellidae was carried by Rioja (1923) who divided the family in three subfamilies: Myxicolinae, Fabriciinae, and Sabellinae, based largely on setal characters. Johansson (1927) subsequently modified Rioja (1923) scheme assigning Myxicolinae to the Fabriciinae. Based in a detailed cladistic analysis of the sabellids and associated taxa, Fitzhugh (1989) recognized the monophyletic condition of Sabellidae supported by three setal synapomorphies: (1) thoracic neuropodial uncini with the main fang surmounted by a broad series of smaller teeth; (2) the proximal region of uncini with a handle or shaft, and; (3) spinelike abdominal neurosetae. Fitzhugh (1989) was able to confirm the monophyly for only two sabellid subfamilies, the Fabriciinae and Sabellinae, although several genera included to that point of time within Fabriciinae were transferred to Sabellinae. The emended diagnoses for subfamilies are currently used (*e.g.* Smith, 1991; Rouse, 2000; Bick, 2005).

Sabellids are distributed worldwide and are associated with hard surfaces and soft sediments for all latitudes from intertidal areas to shelf depths (Fauchald, 1977; Rouse & Pleijel, 2001; Giangrande & Licciano, 2004).

The major characteristics used in sabellids taxonomy include: (a) the presence or absence of companion setae to the neuropodial uncini in the thorax also called pennoned setae or pick-axe setae, (b) the structure of the thoracic uncini which may be acicular or avicular, and (c) the anatomy of the branchial crown and associated structures such as dorsal and ventral lips, pinnular, and radiolar appendages (Perkins, 1984; Fitzhugh, 1989; Rouse, 2000).

SYSTEMATICS

Family Sabellidae Latreille, 1825

Subfamily Sabellinae Johnston, 1846

Genus *Bispira* Krøyer, 1856

Krøyer (1856) defined *Bispira* without including any species. Claparède (1868) was the first to refer a species to the genus, *Bispira volutacornis*, based on the

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description of *Amphitrite volutacornis* Montagu, 1804. This genus has a crown with unflanged base, usually in two semicircles with numerous pairs of radioles sometimes with composite eyes; crown with shallow palmate membrane about 1/10 of total crown length; collar margins usually separated dorsally by a distinct gap; inferior thoracic notosetal fascicles arranged in bundles with irregular longitudinal setal rows; inferior thoracic notosetae spinelike. Abdominal neurosetal tori as conical lobes; abdominal neurosetal fascicles arranged in a C-shaped configuration or partially spiraled; anterior abdominal neurosetae spinelike in anterior and posterior rows; thoracic uncini avicular; companion setae with distal ends as distinctly asymmetrical membranes; interramal eyespots present (Fitzhugh, 1989; Knight-Jones & Perkins, 1998).

Bispira melanostigma (Schmarda, 1861)
(Fig.1)

Sabella variegata Krøyer, 1856.
Sabella thoracica Krøyer, 1856.
Sabella melanostigma Schmarda, 1861.
Sabella bipunctata Baird, 1865.
Bispira melanostigma (Schmarda, 1861) comb.nov. – Knight-Jones & Perkins, 1998.

Material – 6 specimens under stones in tidal pools, Rocas Atoll, Brazil.

Diagnosis – Radioles in semicircular arrangement united by a palmate membrane, most radioles with five pairs of dark brown composite eyes. Ventral lappets prominent and involuted medially to form small pockets and collar dorsal margins separated by a wide gap. Discrete dark spots close to dorsal sides on all parapodia, and small brown strips at ventral end of each thoracic neuropodial torus and on ventral surface of each abdominal setiger.

Description – Body 58 to 77mm long without crown, in complete specimens; thorax 3 to 5mm wide, narrower in side view; 10 to 14 thoracic and 102 to 122 abdominal setigers (Fig.1a). Crown 17 to 27 mm long with 18 to 25 pairs of radioles usually in semicircular arrangement; most radioles with 5 pairs of dark brown composite eyes, radioles united by a palmate membrane in 1/8 of their total length, stylodes absent; dorsal lips tapered without radiolar appendages; dorsal margins of collar prominent and separated by a wide gap, lateral margins reaching junction between thorax and crown. Ventral lappets prominent and involuted medially to form small pockets; thoracic setigers becoming gradually narrower posteriorly; describe ventral sacs, since they are mentioned in the remarks first thoracic notosetae spinelike all with similar size (Fig.1b), notosetae on posterior thoracic setigers spinelike or elongate spinelike (Fig.1c), all thoracic notosetae slightly flattened laterally; thoracic neuropodial avicular uncini (Fig.1d) in a single row; companion setae with a thin, tapered extension on one side (Fig.1e). Abdominal neurosetae elongate spinelike all similar in size; abdominal notopodial avicular uncini in a single row, without companion setae. Pygidium well developed without eyespots.

Color (fixed material) pale with dark bands around the crown, diffuse liver-brown patches on dorsal thorax and ventral sacs, discrete dark spots close to dorsal sides on all parapodia, and small brown strips at ventral end of each thoracic neuropodial torus and on ventral surface of each abdominal setiger; collar with similar pigmentation on inner surface of ventral lappets and with elongate yellowish band parallel to dorsolateral margins.

Remarks – The smallest specimen observed in this study is larger than the largest specimen recorded by Knight-Jones & Perkins (1998) in their revision. Nevertheless, morphological differences are restricted to slight differences in number of abdominal setigers (102-122 in our material vs 60-100) and crown size (17-27mm vs 8-15mm).

Bispira melanostigma seems to be very close to *B. viola* (Grube, 1863) (Knight-Jones & Perkins, 1998). However, *B. melanostigma* differs in having a shorter first setiger and very protuberant ventral sacs.

Distribution – *Bispira melanostigma* is widespread in the Caribbean and Gulf of Mexico, extending northward as far as North Carolina and Bermuda (Knight-Jones & Perkins, 1998). The distribution is southerly expanded to Rocas Atoll, Brazil.

Bispira klautae sp.nov.
(Figs.2-3)

Material – 2 specimens associated with calcareous algae in tidal pools from Rocas Atoll, Brazil.

Diagnosis – Crown with reddish brown bands. Radioles in semicircular arrangement with dark brown composite eyes and united by a palmate membrane. Ventral lappets prominent and collar dorsal margins widely separated apparently pushed aside by spongy masses. Interramal spots present.

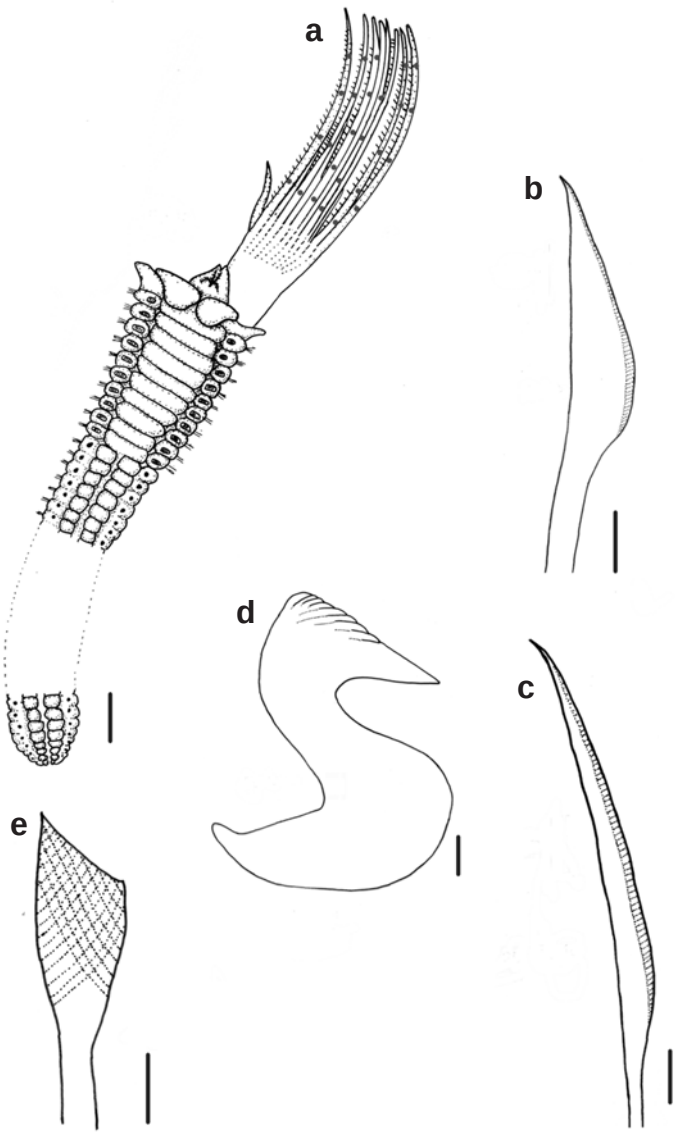

Fig.1- *Bispira melanostigma*: (a) ventral view, scale bar = 2mm; (b) thoracic spinelike notosetae, scale bar = 25μm; (c) thoracic elongate spinelike notosetae, scale bar = 25μm; (d) thoracic avicular uncini, scale bar = 10μm; (e) companion setae, scale bar = 10μm.

Description – Holotype (IBUFRJ-0454) complete; body 12mm long without crown, thorax 2mm wide (Fig.2a), with 9 thoracic and 36 abdominal setigers; crown 9mm long with 15 pairs of radioles in semicircular arrangement. Paratype (IBUFRJ-0455) complete; body 12mm long without crown, thorax 2mm wide, with 7 thoracic and 33 abdominal setigers; crown 9mm long with 15 pairs of radioles in semicircular arrangement. Radioles in the crown with dark brown composite eyes (Fig.2b); palmate membrane in 1/8 of total crown length, stylodes absent; tapering dorsal lips with dark brown tips, without radiolar appendages; dorsal margins of collar prominent and separated by a wide gap, lateral margins reaching junction between thorax and crown. Ventral lappets prominent and with dorsal margins widely separated, apparently pushed aside by spongy, cushion-like masses (Figs.2c, 3); thoracic setigers becoming gradually narrower posteriorly with two types of notosetae: spinelike (Fig.2d) and shorter broadly hooded (Fig.2e); thoracic neuropodial avicular uncini (Fig.2f) in a single row; companion setae with thin, wide, asymmetrical blades (Fig.2g). Abdominal neurosetae in a C-shaped arrangement, including longer needlelike (Fig.2h) and shorter spinelike setae; abdominal notopodial avicular uncini in a single row, without companion setae. Pygidium well developed without eye-spots.

Color after fixation: crown with reddish-brown bands, collar liver-brown in inner surface and whole body with conspicuous interramal spots.

Remarks - *Bispira klautae* sp. nov. belongs to a group of species that possesses thoracic spongy, cushion-like masses together with *B. porifera* (Grube, 1878) and *B. paraporifera* Tovar-Hernández & Salazar-Vallejo, 2006. Nevertheless it differs form *B. porifera* mainly by the presence of composite eyes in radioles and by thoracic notosetae including longer spinelike and shorter broadly hooded setae in *B. klautae* sp. nov. Besides, *B. klautae* sp. nov. has more thoracic setigers (9 in *B. klautae* sp. nov. vs 8 in *B. porifera*), a lower number of radioles (15 vs 45-80) and a shorter crown (9 mm vs 21-40 mm). It differs from *B. paraporifera* by the shape of the cushion-like masses (much wider in *B. klautae*) and by having 15 pairs of radioles and 3 pair of eyes (vs 14 and 4 in *B. paraporifera*). Furthermore, *B. klautae* has more thoracic setigers (9 in *B. klautae* sp. nov. vs 8 in *B. paraporifera*) and possess shorter broadly hooded setae besides spinelike ones.

Bispira klautae sp. nov. differs from all others species of the genus *Bispira* by the presence of the spongy masses in the thorax. It differs also from *B. tricyclia* (Schmarda, 1861) in the color of the bands in the branchial crown (reddish in *B. klautae* sp. nov. vs pale yellowish in *B. tricyclia*), the number of thoracic setigers (9 vs 12-21), the number of radioles (15 vs 29-132 on the left and 23-66 on the right) and the

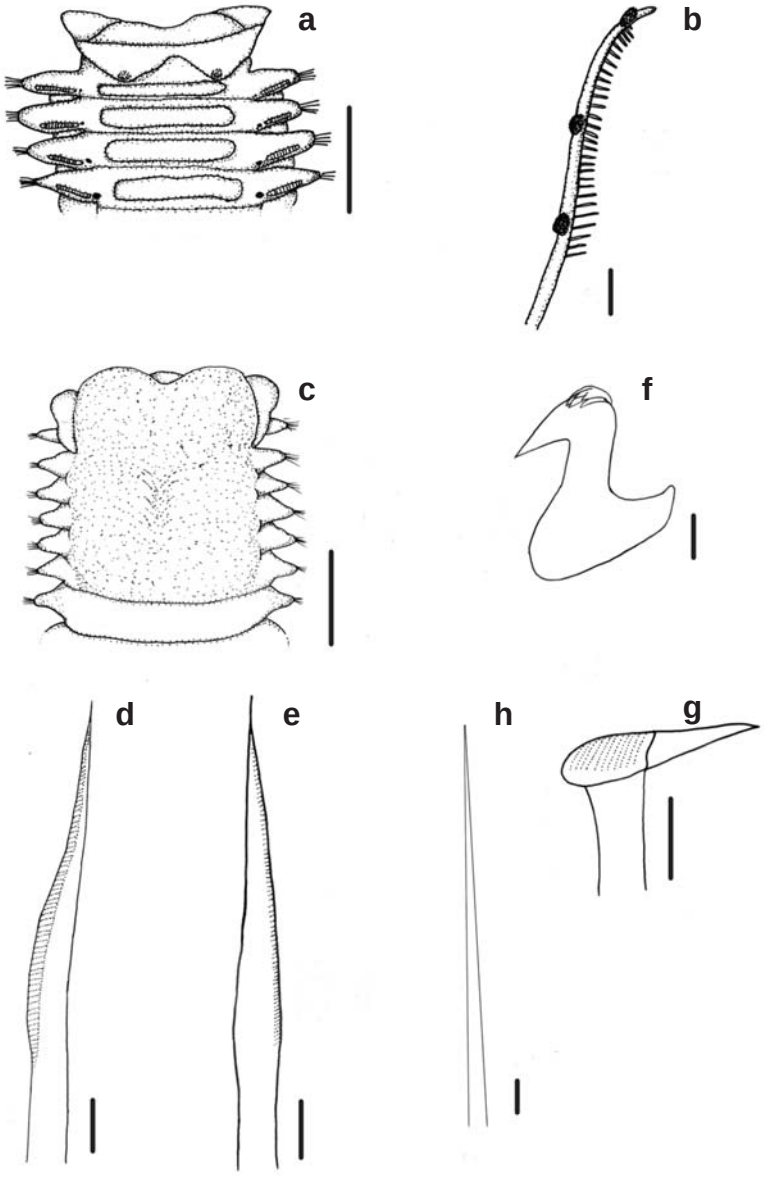

Fig.2- *Bispira klautae* sp.nov.: (a) anterior end, ventral view without branchial crown, scale bar = 1mm; (b) radiole with composite eyes, scale bar = 1mm; (c) anterior end, dorsal view, scale bar = 1mm; (d) thoracic spinelike notosetae, scale bar = 25µm; (e) thoracic broadly hooded notosetae, scale bar = 25µm; (f) thoracic avicular uncini, scale bar = 10µm; (g) companion setae, scale bar = 10µm; (h) abdominal needlelike neurosetae, scale bar = 10µm.

presence of interramal spots. The new species differs from *B. viola* (Grube, 1863) in the arrangement of composite eyes (always single in *B. klautae* sp. nov. vs single or paired in *B. viola*), the number of thoracic setigers (9 vs 11-17) and the number of radioles (15 vs 25) (Knight-Jones & Perkins, 1998).

Distribution – Rocas Atoll, Brazil.

Etymology – The spongy appearance of the thorax lead us to name the species for Dr. Michelle Klautau, whose work with sponges inspired our description.

Genus *Notaulax* Tauber, 1879

The genus *Notaulax* was described by Tauber (1879) and revised by Perkins (1984). This genus has a crown with numerous radioles; palmate membrane present; simple radiolar eyes organized in groups or on lateral margins distal to palmate membrane; branchial lobes very long with flanges in dorsal and ventral margins; collar setae spinelike arranged in longitudinal or oblique fascicles; thoracic superior notosetae spinelike and inferior ones paleate, both types arranged in two transverse rows; abdominal neurosetae in two transverse rows of capillary and paleate with long mucros; thoracic uncini avicular, companion setae present with teardrop-shaped membranes; abdominal uncini with main fang surmounted by teeth of equal size (Perkins, 1984; Fitzhugh, 1989; Nogueira, 2000).

Notaulax occidentalis (Baird, 1865) (Fig.4)

Sabella occidentalis Baird, 1865
Sabella alba Treadwell, 1917
Parasabella sulfurea Treadwell, 1917.
Hypsicomus purpureus Treadwell, 1924
Notaulax occidentalis (Baird, 1865) comb.nov. – Perkins, 1984

Material – 1 complete specimen and 1 anterior fragment, both associated with calcareous algae in tidal pools from Rocas Atoll, Brazil.

Diagnosis – Crown purple brown with white bands in the tip of radioles. Radioles in a semicircular arrangement united by a palmate membrane. Radiolar eyes present in scattered rows. Branchial lobes purple brown and long. Collar setae in an oblique fascicle. Abdomen pale with a dark yellowish band in the middle of ventral side and two eyespots in pygidium.

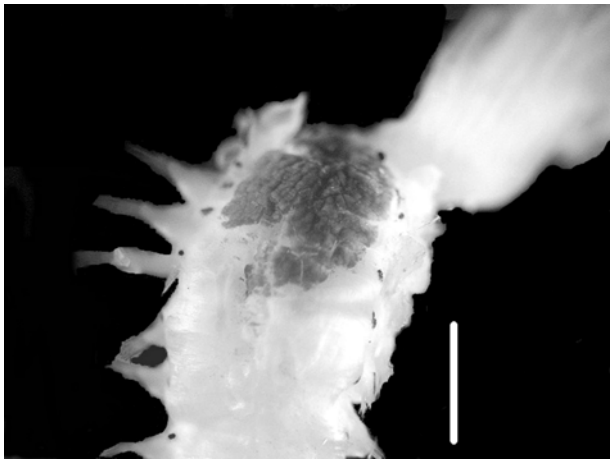

Fig.3- *Bispira klautae* sp.nov.: ventral side of thorax showing spongy, cushion-like mass, scale bar = 1mm.

Description – Body 54mm long without crown, thorax 4mm wide; with 8 thoracic and 138 abdominal setigers in the complete specimen (Fig.4a). Branchial crown, 16-23mm long, purple brown with white bands in the tip of radioles; 20 pairs of radioles in semicircular arrangement. Branchial lobes very long, exposed, stained with purple pigment. Radioles united by a palmate membrane about 1/4 of their total length; tips without pinnules and flattened; without stylodes; eyes arranged in scattered rows beginning above palmate membrane. Collar segment bilobed, dorsally purple brown; ventral side with two triangular lappets and rectangular shield; collar setae spinelike, in oblique rows. Thoracic notopodial fascicles bearing spinelike (Fig.4b, c) and two rows of paleate (Fig.4d) setae; thoracic neuropodia with avicular uncini (Fig.4e) and companion setae with a distally pointed, teardrop-shaped membrane (Fig.4f). Thoracic ventral shields trapezoidal. Neurosetae in anteriormost abdominal setigers including paleate and capillary; posteriormost setigers with paleate setae bearing longer mucros (Fig.4g) and capillary setae. Abdominal notopodial avicular uncini in a single row. Pygidium with two eyespots.

Color (after fixation) purple brown with white bands in the tip of radioles; thorax reddish-brown with a white band along dorsal surface; abdomen pale with a dark yellowish band along ventral side.

Remarks – These specimens of *N. occidentalis* seems to be very similar to those described by PERKINS (1984) concerning size, color pattern, habitat, and others taxonomic traits.

As regards the Brazilian shores, *Notaulax* specimens were previously referred to as *N. nudicollis* (Krøyer, 1856) (PERKINS, 1984), form of the southern coast, and as *Notaulax* sp. (NOGUEIRA, 2000), from the southeastern coast. However, *N. occidentalis* differs from these species by having ventrally incised collar margins in adults.

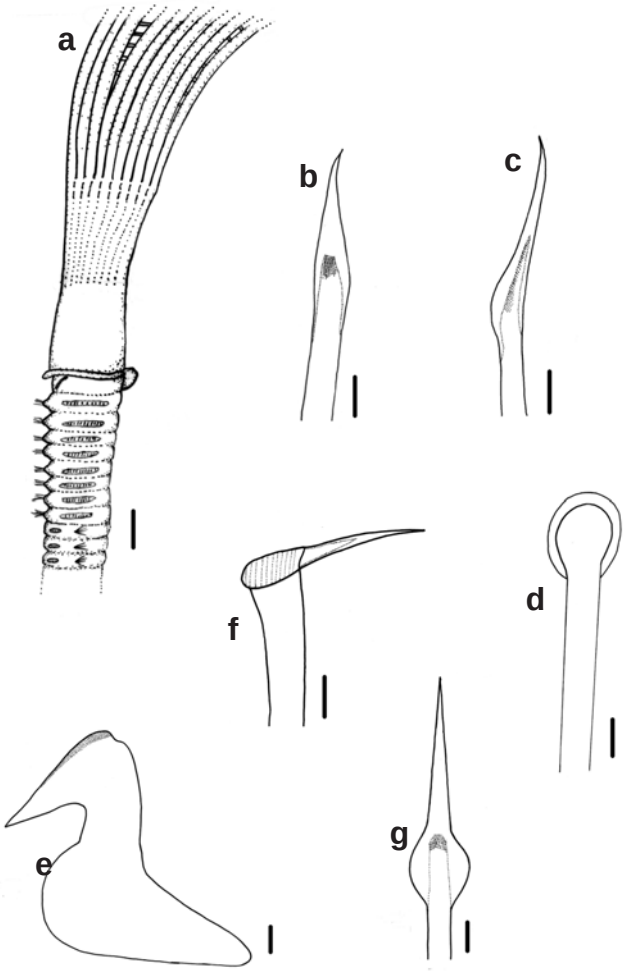

Fig.4- *Notaulax occidentalis*: (a) anterior end, lateral view, scale bar = 1mm; (b) thoracic spinelike notosetae, frontal view, scale bar = 25µm; (c) thoracic spinelike notosetae, lateral view, scale bar = 25µm; (d) thoracic paleate notosetae, scale bar = 25µm; (e) thoracic avicular uncini, scale bar = 10µm); (f) companion setae, scale bar = 10µm; (g) abdominal modified paleate neurosetae, scale bar = 10µm.

NONATO & LUNA (1970) and RULLIER & AMOUREUX (1979) reported *Hypsicomus elegans* (Webster, 1884) from the northeastern coast of Brazil, including Rocas Atoll. Nevertheless, *H. elegans* is actually a junior synonym of *N. occidentalis* (PERKINS, 1984). The occurrence of *N. occidentalis* herein reported is close to the localities sampled by NONATO & LUNA (1970) and RULLIER & AMOUREUX (1979), suggesting that their reports are likely to refer to *N. occidentalis*.

Distribution – *N. occidentalis* is widespread in the tropical eastern Atlantic, extending northward as far as North Carolina (PERKINS, 1984). The distribution is southerly expanded to Rocas Atoll, Brazil. Usually found in tidal pools or associated with coral reefs or calcareous algae.

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