New records of polychaetes (Annelida) for northern Ecuador

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Even though Ecuador is one of the twelve mega-diverse countries in the world, the polychaetes are still poorly known. Twelve polychaete species, namely Hemipodia pustatula (Glyceridae); Microphthalmus arenarius (Hesionidae); Scoletoma zonata (Lumbrineridae); Nereis riisei, Pseudonereis gallapagensis (Nereididae); Armandia salvadoriana, Euconus mucronata (Opheliidae); Phyllodoce multiseriata (Phyllodocidae); Pisione longispinulata (Pisionidae); Malacoceros indicus, Scolelepis (Scolelepis) acuta (Sipionidae) and Opisthohyssis arboricola (Syllidae) are newly reported in the intertidal sandy beaches of Bunche (0°39′01.98″N 80°03′55.01″W) and Cabo San Francisco (0°38′16.35″N 80°03′14.07″W), Esmeraldas Province (Ecuador). Furthermore, an amended diagnosis of Pisione longispinulata is presented.

Keywords: eastern Pacific, sandy beaches, intertidal, marine worms

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INTRODUCTION

Ecuador possesses a great variety of coastal environments allowing for a high diversity of marine species. However, systematic studies on marine invertebrates are scarce, especially in polychaetes. In continental Ecuador, only 29 families, 53 genera and approximately 75 species of polychaetes are recorded so far. Hartman (1939) pioneered polychaete studies by describing four new species and ten new records from Puna and Santa Clara Islands (Guayas Province). Later, Cruz et al. (1980) reported four new records from benthic samples collected on the Estero Salado of Guayaquil Gulf. In the same Gulf, near that area, 29 species of polychaetes were identified by Villamar (1983), one of which was a new species of Grubeulepis. The same author in 1989 reported nine new records at Canal del Morro and Jambieli in the Guayaquil Gulf. In the intertidal zone of Monteverde (Guayas Province), Villamar & Cruz (2007) later reported three new records for Ecuador. A new species of Australonuphis used as fishing bait, was described by de León-González et al. (2008) in Santa Elena Bay (Guayas Province). In northern Ecuador, very little is known about this group, and only one ecological study has been carried out by Villamar (2006) in the intertidal zones of Manabi and Esmeraldas Provinces. In that paper, the author reported 12 genera and 27 species, of which 14 constituted new records for this country.

In order to increase the knowledge about this group of invertebrates on the Ecuadorian coast, we herein provide a checklist of the polychaete fauna from Bunche and Cabo San Francisco Beaches (Esmeraldas Province), northern Ecuador.

MATERIALS AND METHODS

Samples were collected in March 2009 (dry season) in the intertidal zone of two sandy beaches: Bunche (0°39′01.98″N 80°03′55.01″W) and Cabo San Francisco (0°38′16.35″N 80°03′14.07″W) located in the Esmeraldas Province, of northern Ecuador (Figure 1). The beach dynamics are different. Bunche is characterized as a low energy beach, a calm and protected area, with soft sloping banks and very fine particle sand, while Cabo San Francisco is characterized as a high energy environment (subjected to frequent and severe storms), with high slopes and larger than average grain size. Fresh water discharges affect both beaches. Sediment samples were sieved through a 1-mm mesh. All the polychaetes species were separated from the sediment, except one: Phyllodoce multiseriata Ríoja, 1941, which was found in tidal pools at low tide. Specimens were fixed in 10% formalin and later preserved in 70% ethanol. The identifications were made using the taxonomic keys of Fauchald (1977) and de León-González et al. (2009). Samples were deposited at the Polychaetological Collection of the Universidad Autónoma de Nuevo León (Phyllodoce multiseriata, UANL 7803; Opisthohyssis arboricola, UANL 7804; Hemipodia pustatula, UANL 7805; Nereis riisei, UANL 7806; Pseudonereis gallapagensis, UANL 7807).

RESULTS

Twelve polychaete species belonging to twelve genera and nine families were recorded from Bunche and Cabo San Francisco Beaches. This list includes eleven new records...
for Ecuador and one, *Nereis riisei*, for northern Ecuador. Short descriptions of the polychaete species sampled for this study are given below.

**SYSTEMATICS**

**Family GLYCERIDAE Grube, 1850**

**Genus Hemipodia** Kinberg, 1865

*Hemipodia pustatula* (Friedrich, 1956) (Figure 2A)

*Hemipodus pustatulus*: Friedrich, 1956: 61, figure 4A–C.


**MATERIAL EXAMINED**

Bunche Beach, two complete specimens, six anterior and three posterior fragments, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**

Up to 40 mm long and 1 mm wide, 118 chaetigers. Live specimens bright red; preserved specimens orange to brown. Mandibles with simple rod-like ailerons. Pharynx covered by simple papillae, with 'U'-shaped ridges: digitiform ones with 10–15 ridges and conical ones with 8–10 ridges. Branchiae absent. All parapodia uniramous, with one long subtriangular prechaetal lobe and one rounded to triangular postchaetal lobe; prechaetal lobe with digitiform distal process from median parapodia to the posterior end of the body. Parapodia with one aciculum and compound spinigers. Globular dorsal cirri. Triangular ventral cirri on anterior parapodia, on median parapodia subulate and on posterior parapodia rounded to oval. Pygidium unknown.

**DISTRIBUTION**

Pacific Ocean: México (Bahía Kino and Mazatlán), El Salvador (Metalico, Acajuila, Las Salinas, La Libertad, San Diego, Toluca, Amate Campo, Las Hojas, Los Blancos, El Zapote, La Chepona and El Cuco), Costa Rica, Panama and Chile (Bahía San Vicente); Atlantic Ocean: Caribbean Sea, Costa Rica, Panama and Brazil (Paranagua).

**Family HESIONIDAE Sars, 1872**

**Genus Microphthalmus** Mecznikow, 1865

*Microphthalmus arenarius* Westheide, 1973 (Figure 2B)


**MATERIAL EXAMINED**

Cabo San Francisco Beach, six complete specimens, two anterior and two posterior fragments, 20 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**

Up to 1.5 mm long and 0.3 mm wide, 22 chaetigers. Preserved specimens brown. Cylindrical body, with three antennae, median one inserted at posterior margin of prostomium. Six pairs of long tentacular cirri inserted on following three segments. A lateral pair of red eyes, located posteriorly in the prostomium. Simple palps with palpophore reduced. Notopodia reduced with compound spinigers, neuropodia with falcigers. An expanded anal plate on the posterior end. The anal plate is smooth and at least as wide as the last chaetiger. Two anal cirri, twice as long as anal plate.

**DISTRIBUTION**

Atlantic Ocean: Bermudas.

**Family LUMBRINERIDAE Schmarda, 1861**

**Genus Scoletoma** Blainville, 1828

*Scoletoma zonata* Jonhson, 1901 (Figure 2C)

*Lumbriconereis zonata*: Johnson, 1901, 408–409, pl. 9, figures 93–100.


Material Examined
Bunche Beach, one complete specimen, three anterior fragments and one posterior fragment, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

Diagnosis
Up to 65 mm long and 0.5 mm wide, for 303 chaetigers. Preserved specimens pink to brown, highly iridescent, with a little lateral black intersegmental dot in the middle of each segment throughout body. Subtriangular prostomium. Maxillary formula as follows: with five pairs of maxillae. Carrier jaws attached to the maxilla I throughout the base. Plate connecting the maxilla I with II, broad and slightly sclerotized. Maxilla II as long as maxilla I. Maxilla I with a single tooth, maxilla II with three teeth and accessory lamella. Accessory lamella wider than maxilla II and occupies three-quarters of its lateral border. Maxilla III with two teeth, maxilla IV with a single tooth, both fully pigmented. Notopodia reduced with small dorsal cirri. Postchaetal lobe slightly longer than the prechaetal one. Without branchiae. Simple hooded hooks with short cap and simple limbate chaetae from chaetiger 1. Pygidium with two pairs of short anal cirri.

Distribution
Pacific Ocean: United States (Dillon Beach, Tomales Bay, Bodega Lagoon and Puget Sound region), Costa Rica and Panama (Venado Beach).
Family **Nereididae** Lamarck, 1818

Genus **Nereis** Linnaeus, 1758

*Nereis riisei* Grube, 1857  
(Figure 2D)


**MATERIAL EXAMINED**

Bunche Beach, one incomplete specimen, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**

Specimen of 10 mm long, 1 mm wide, 55 chaetigers. Preserved specimen unpigmented. Prostomium pentagonal in shape, with two pairs of eyes in trapezoidal arrangement, the posterior pair larger. A pair of short antennae that do not exceed in length the distal part of the palps. Globose palps, subshperical palpostyles. Peristomium as long as the following two segments, but less wide, with four pairs of tentacular cirri, the pair of larger cirri reach chaetiger 3. Pharyngeal paragnaths not visible given the size of specimen. Subconical dorsal ligule, rounded median ligule in all notopodia. Neuropodia with subtriangular ligule on anterior parapodia, and subulate on median and posterior parapodia. Dorsal cirri inserted medially on dorsal ligule, ventral cirri inserted below the ventral ligule. Notochaetae with homogomph spinigers in all parapodia; in median and posterior parapodia one homogomph long bladed falciger appears. Neuropodia with homogomph and heterogomph spinigers and short bladed heterogomph falcigers. Pygidium unknown.

**DISTRIBUTION**

Pacific Ocean: Mexico (Santa Maria Bay, Gulf of California, Guerrero, Socorro Island), Costa Rica (Nicoya Gulf, Papagayo Gulf), Panama (Gorgona Island, Coiba Island), Colombia (Gorgona Island) and Ecuador (La Libertad, Galapagos Island); Atlantic Ocean: Gulf of Mexico (Florida, Texas, Veracruz, Ciudad del Carmen, Alacranes Reef, Cayo Arcas, Triángulos Oeste, Cayo Nuevo) and Brazil (Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, Alagoas); Caribbean Sea: Bonaire, Anguilla, St Eustatius, Aruba, Curaçao, Barbados, St Vincent, Grenada, Barbuda, Antigua, Jamaica, Cuba (La Habana Bay), Venezuela (Cariaco Gulf), Colombia (Nenguangue Bay), Panama (Galeta Reef) and Mexico (Nicchehabin Reef, east of Allen Point, Ascension Bay and Cozumel Island).

Family **Pseudonereididae** Lamark, 1818

Genus **Pseudonereis** Kinberg, 1866

*Pseudonereis gallagapensis* Kinberg, 1866  
(Figure 2E)


**MATERIAL EXAMINED**

Cabo San Francisco Beach, one complete specimen, 20 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**

Specimen of 11 mm long, 0.5 mm wide, 61 chaetigers. Preserved specimen light brown. Sub-pentagonal prostomium. A pair of antennae and a pair of globose palps. Two pairs of black eyes. Four pairs of tentacular cirri, dorsal one longest. Birramous parapodia. Cirriform dorsal cirri in all parapodia. All notopodia highly developed, with ligule, lobes and chaetae. Pharynx armed in both rings, maxillary ring, Group I, two small cones; Group II, three pectins; Group III, four pectins in oval arrangement; Group IV, eight small cones and 20 wide basally, in the distal region, four in according pectins’ growing arrangement. Oral ring, Group V, one big cone; Group VI, a short transverse bar into a cone shape; Groups VII–VIII, 22 cones in two lines. Dorsal cirrus inserted distal to the dorsal ligula in posterior parapodia. Notopodia with homogomph spinigers and neuropodia with homogomph spinigers and heterogomph falcigers. Pygidium with two ventrolateral anal cirri.

**DISTRIBUTION**

Pacific Ocean: Ecuador (Galapagos Islands), Peru and Chile; Atlantic Ocean: Gulf of Mexico, Panama, Brazil, South Africa; Indian Ocean.

Family **Opheiliidae** Malmgren, 1867

Genus **Armandia** Filippi, 1861

*Armandia cf. salvadoriana* Hartmann-Schröder, 1956  
(Figure 2F)

**Armandia salvadoriana**: Hartmann-Schröder 1956: 95, figures 6–8.

**MATERIAL EXAMINED**

Bunche Beach, eight complete specimens, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**

Up to 13 mm long and 1 mm wide, 35 chaetigers. Preserved specimens unpigmented. Elongate body with a lateral groove. Prostomium long, conical and acuminate; large nuchal organs, without ocelli. Cirriform branchiae, longer than notochaetae, recurved over the body, present from chaetiger two to the end of body, although in some individuals they may be absent in the last chaetigers. Anal funnel long with 6–7 lanceolate papillae and with a long medial cirri. With 23–25 pairs of lateral eyes starting from chaetigers 6–7.

**DISTRIBUTION**

Pacific Ocean: El Salvador (San Juan, Pajarita and Madre-Sal) and Costa Rica (Golfo de Nicoya).

**REMARKS**

In the original description of *A. salvadoriana* Hartmann-Schröder, 1956, the number of pairs of eyes is 15, while our specimens have 23–25 pairs of eyes. Type material of *A. salvadoriana* was not observed; however, the
Ecuadorian form is similar to the El Salvadorian one in all the remaining characters.

**Family OPHIOLIDAE** Malmgren, 1867
**Genus Euzonus** Grube, 1866
**Euzonus mucronata** Treadwell, 1914

*Euzonus mucronata*: Blake, 2000: 152–153, figure 7.2A–C, F.

**MATERIAL EXAMINED**
Bunche Beach, six complete specimens, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**
Up to 14 mm long and 0.5 mm wide, 38 chaetigers. Live specimens unpigmented except for the pink gut; preserved specimens unpigmented. Body divided into three regions: cephalic region that includes the prostomium and the first two chaetigers; a thoracic region that includes the chaetigers 3–11 and the abdominal region that comprises two chaetigers without branchiae, 18 chaetigers with branchiae and eight post-branchial segments. Cylindrical body on the anterior segments, with ventral groove on branchial region that continues to the posterior end. Prostomium small and conical, buccal organs present. Parapodia birramous; all chaetae are capillaries; notochaetae longer than neurochaetae. Smooth branchiae with two branches. Pygidium with a long ventral cirrus and seven pairs of digitiform lateral lobes.

**DISTRIBUTION**
Pacific Ocean: Canada, United States (Dillon Beach) and Mexico.

**Family PHYLLODOCIDAE** Ørsted, 1843
**Genus Phyllodoce** Lamarck, 1818
**Phyllodoce multisierisata** Rioja, 1941


**MATERIAL EXAMINED**
Bunche Beach, eight complete specimens, two anterior and four median fragments, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**
Up to 45 mm long and 1.5 mm wide, 155 chaetigers. Live specimens greenish with a brown intersegmental transverse band; preserved specimens with the same pattern colour. Prostomium chordate. With four antennae and nuchal band; preserved specimens with the same pattern colour. Up to 14 mm long and 0.5 mm wide, 38 chaetigers. Live specimens unpigmented except for the pink gut; preserved specimens unpigmented. Body divided into three regions: cephalic region that includes the prostomium and the first two chaetigers; a thoracic region that includes the chaetigers 3–11 and the abdominal region that comprises two chaetigers without branchiae, 18 chaetigers with branchiae and eight post-branchial segments. Cylindrical body on the anterior segments, with ventral groove on branchial region that continues to the posterior end. Prostomium small and conical, buccal organs present. Parapodia birramous; all chaetae are capillaries; notochaetae longer than neurochaetae. Smooth branchiae with two branches. Pygidium with a long ventral cirrus and seven pairs of digitiform lateral lobes.

**DISTRIBUTION**
Pacific Ocean: Canada, United States (Dillon Beach) and Mexico.

**Phyllodoce** Agudo & San Martín, 2004


**MATERIAL EXAMINED**
Cabo San Francisco Beach, 82 complete specimens, nine anterior, two median and four posterior fragments, of which 29 were males (26 complete specimens and three anterior fragments); 20 March 2009, coll. Berenice Trovant and Santiago Tineo.

**DIAGNOSIS**
Up to 3.5 mm long, 0.5 mm wide, 36 chaetigers. Preserved specimens unpigmented. Body elongate and filiform. Small prostomium, buccal segment directed forward and partially fused to prostomium; without chaetae. A long pair of smooth palps. Buccal segment with dorsal tentacular cirri directed forward, elongated (approximately one-third of the length of the palps); short globular ventral cirri. This segment carries a pair of buccal aciculae that arise internally at the base of the dorsal cirri, firm, slightly emerging and distally expanded. Globular dorsal cirri with a distal papilla small and spherical. A pair of eyes located between chaetigers 2–3. Reversible pharynx, with two pairs of chitinous jaws seen by transparency. Brown mandibles occur in the third chaetiger. Parapodia with four chaetae, one simple chaetae and three falci-gers (the first longest) with long secondary spines. Notoacicula embedded throughout the entire body, not protruding. The 29 males had a pair of copulatory organs located between chaetigers 12 and 27, and three of them also had a second pair located between chaetigers 25 and 28. Rounded pygidium with a pair of anal cirri.

**DISTRIBUTION**
Pacific Ocean: Panama (Coiba Island).

**Malacoceros indicus** (Fauvel, 1928)


**MATERIAL EXAMINED**
Bunche Beach, one anterior fragment, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.

**Remarks**
Agudo & San Martín (2004) described *Pisione longispinulata* based on two males and found that they had one copulatory organ between segments 18 and 20, while in our specimens we found the first pair between segments 13 and 28. Furthermore, three specimens presented a second pair of copulatory organs. Given the number of specimens we have been able to observe, we believe there might be a wider variation in the number and in the distribution of the copulatory organs in this species.

**Family SPIONIDAE** Grube, 1850
**Genus Malacoceros** Quatrefages, 1843
**Malacoceros indicus** (Fauvel, 1928)


**MATERIAL EXAMINED**
Bunche Beach, one anterior fragment, 21 March 2009, coll. Berenice Trovant and Santiago Tineo.
DIAGNOSIS

DISTRIBUTION
Pacific Ocean: Chile; Atlantic Ocean: Gulf of Mexico, South Africa; Indian Ocean: Gulf of Manaar, Mozambique and New Caledonia.

Family SPIONIDAE Grube, 1850
Genus Scolelepis Blainville, 1828
Scolelepis (Scolelepis) acuta Treadwell, 1914
(Figure 2K)

Scolelepis (Scolelepis) acuta: Delgado-Blas, 2006: 79–81, figure 2; Delgado-Blas, 2009: 589–615.

MATERIAL EXAMINED
Bunche Beach, five anterior fragments and one median fragment, 21 March 2009, and Cabo San Francisco Beach, seven anterior fragments, 20 March 2009, coll. Berenice Trovant and Santiago Tineo.

DIAGNOSIS
Up to 11 mm long and 1 mm wide. Preserved specimens unpigmented. Body elongated, conical prostomium and short peristomium. Two pairs of red eyes. Two long tentacular palps, slightly rugose, with two longitudinal rows of cilia. The first segment with short neurochaetae and without notochaetae. Chaetiger 5 without modified chaetae. Postchaetal lamella associated with notopodia and neuropodia of anterior region. All lamellae decrease in size toward posterior region. Branchiae from second chaetiger, basally fused to the lamella in most parapodia. Simple chaetae and neuropodial hooded hooks with three small teeth. Pygidium unknown.

DISTRIBUTION
Pacific Ocean: United States (San Diego, California).

Family SYLLIDAE Grube, 1850
Genus Opisthopyllis Langerhans, 1879
Opisthopyllis arboricola Hartmann-Schröder, 1959
(Figure 2I)


MATERIAL EXAMINED
Bunche Beach, one anterior and posterior fragment, 21 March 2009 and Cabo San Francisco Beach, one complete specimen, 20 March 2009, coll. Berenice Trovant and Santiago Tineo.

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REFERENCES


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