INTRODUCTION

The state of Veracruz, located on the eastern coast of Mexico (Gulf of Mexico), possesses a great variety of coastal environments, from sandy beaches, rocky shores, coralline reefs and islands. Although this ecosystem supports a high diversity of habitats, knowledge of the family Eunicidae in these zones is brief. Previously 12 eunicid species were recorded for this area, 7 of these were reported by Rioja (1946, 1958 and 1960): Eunice antennata, Eunice aphroditois, Eunice cariboea, Eunice rubra, Lysidice ninetta, Marphysa minima and Palola siciliensis. Later, other researchers extended the list of known eunicid species including: Salazar-Vallejo (1981) reported E. cariboea, Eunice norvegica and Paramarphysa longula; Horta-Puga (1982) mentioned E. cariboea and Nematonereis hebes; de León-González (1985) reported L. ninetta and P. longula; Reyes-Barragán and Salazar-Vallejo (1991) reported Marphysa amadae and Marphysa sanguinea for La Mancha lagoon and Sanchez-Wall

Eunicidae (Annelida: Polychaeta) associated with Phragmatopoma caudata Morch, 1863 and some coral reefs from Veracruz, Gulf of Mexico

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SUMMARY: This study analyses species in the family Eunicidae obtained in the intertidal zones of Veracruz, Mexico. The specimens collected were associated with a sabellariid Phragmatopoma caudata Morch, 1863, and collected directly by scuba diving from some coral reefs in Veracruz. Twelve species were found, six of which are reported for the first time in the area: Eunice mutilata Webster, 1884, Eunice panamena (Chamberlin, 1919), Eunice pellucida Kinberg, 1865, Eunice unifrons (Verrill, 1900), Marphysa aransensis Treadwell, 1939 and Nematonereis unicornis (Grube, 1840). Furthermore, the descriptions of two new species of the genera Eunice and Marphysa are included.

Keywords: Polychaeta, Eunicidae, Veracruz, Golfo de México.
(1992) mentioned *Eunice filamentosa*. The main objective of this study was to increase the knowledge of the polychaete fauna of Veracruz.

**MATERIAL AND METHODS**

Specimens were obtained from a range of investigations carried out along the coast of Veracruz during 1992-2003, and were collected in intertidal sand formations of the polychaete sabellariid *Phragmatopoma caudata*, in Punta Morro, Boquilla de Oro, Villa Rica, rocks of Veracruz Harbour and Villa del Mar Beach. In all localities an area of approximately 25 cm² of sabellariid tubes was sampled, extending to the rock beneath. In the laboratory, the sabellariid tubes were broken apart to extract the associated fauna. Other specimens were collected from dead coral in coralline environments at Sacrificios Island, Santiaguillo Island and La Gallega; and terracotta plates (Pl-1, 2, 3) from Blanca, Hornos and Pajaros Reefs. Furthermore, some specimens were collected from the structure that collects water in the Aquarium of Veracruz. The type and non-type materials were deposited in the Polychaete collection of the Universidad Autonoma de Nuevo Leon (UANL). Table 1 shows a list of sampling stations and locations.

**RESULTS**

*Eunice antennata* (Lamarck, 1818)

*Eunice antennata* Hartman, 1944: 115, Figs. 154-156; Day, 1967: 384, Fig. 17.2 k-q; Imajima, 1967: 433, Fig. 10 a-m; Miura, 1977b: 67, Fig. 3 a-n; 1986: 290, Fig. 17; Ibarzabal, 1989: 7, Fig. 3 a-l (in part); 1992:57, Fig. 11 a-e; Gardiner, 1976: 181, Fig. 22 c-j; Dueñas, 1981: 93; Salazar-Vallejo, 1998a: 1500, Fig. 1 a-e.


**Distribution.** This species was originally described from the Gulf of Suez. It is known from tropical and subtropical waters around the world. In Mexico, records of this species are from the peninsular of Baja California, Baja California Sur, Sonora, Nayarit, Guerrero, Oaxaca and the Revillagigedo Islands in the Pacific Ocean, and Veracruz and Quintana Roo in the Atlantic Ocean.

*Eunice cariboea* Grube, 1856

*Eunice (Nicidion) cariboea* Hartman, 1944: 123, Pl. 7, Figs. 157-163; Miura, 1977b: 67, Fig. 3 a-n; 1986: 290, Fig. 17; Ibarzabal, 1989: 13; 7 a-f. *Eunice cariboea* Grube, 1856, fig. 29 g-q; Carrera-Parra & Salazar-Vallejo, 1998a: 1501, Fig. 2 a-e.

Material examined. 83 specimens. Villa Rica, Stn. VR-01 (1), July 2000; Aquarium of Veracruz, Stn. AV-01 (1), July 2000; La Gallega Reef, Stn. V-01 (1), 19°12’00.0” N 96°07’17.0” W, 0.0 m; Pajaros Reef, Stn. PI-1 (1), 19°12’48.0” N 96°07’25.0” W, 1.5 m; Blanca Reef, Stn. PI-1, PI-2, PI-3 19°13’38.0” N 96°05’48.0” W, 3.0 m; Hornos Reef, Stn. PI-1, PI-2, PI-3 19°08’45.0” N 96°00’54.0” W, 3.0 m; Sacrificios Island, Stn. IS-02 19°10’30.2” N 96°05’38.4” W, 2.0 m; Santiaguillo Island, Stn. IS-02 19°08’27.4” N 95°48’30.7” W, 1.5 m.

**Distribution.** Originally described from Christiansted St. Croix, Virgin Islands. Widely distributed in tropical and subtropical coasts, and in the Western Atlantic it is known from Bermuda to Brazil. In Mexico this species is known from Baja California Sur, Sonora, Sinaloa and Guerrero in the Pacific, and from Veracruz in the Atlantic.
**Eunice filamentosa** Grube, 1856

*Eunice filamentosa* Hartman, 1944: 107, pl. 6, Figs. 123; Day, 1967: 392, Fig. 17.5 f-h; Fauchald, 1992:138, Fig. 45 g-q; Gardiner, 1976: 182, Fig. 22 o-t; Dueñas, 1981: 94; Ibarzabal, 1989: 9, Fig. 4 a-h; Carrera-Parra and Salazar-Vallejo, 1998a: 1502, Fig. 4 g-l; Zanol, et al., 2000: 453.


**Distribution.** Amphiamerican in tropical and subtropical waters, known also from South Africa. In Mexico this species is known from the peninsula of Baja California, Sonora, Sinaloa and Oaxaca in the Pacific, and from Veracruz and Quintana Roo in the Atlantic.

**Eunice mutilata** Webster, 1884

*Eunice mutilata* Webster, 1884: 315, Fig. 36 a-d; Hartman, 1944: 113, pl. 6, Figs. 140-141; Ebbs, 1966: 534, Fig. 10 a-j; Fauchald, 1992: 232, Fig. 77 f-n; Zanol, et al., 2000: 455.


**Distribution.** Amphiamerican in tropical waters. In Mexico this species is known from the Revillagigedo Islands, Jalisco and Nayarit in the Pacific, and in the Atlantic it had been recorded previously only from Quintana Roo. This is the first record in Veracruz.

**Eunice panamena** (Chamberlin, 1919)

*Lodice panamena* Chamberlin, 1919: 256, pl. 59, Figs. 4-8, pl. 60, Figs. 1-5. *Eunice panamena* Fauchald, 1992: 249, Fig. 82 f-l.


**Remarks.** The specimens reported here have branchiae present from chaetiger 5, palps and antennae with numerous moniliform articulations, dorsal cirri with 3-4 cylindrical articulations, and hammer-headed aciculae. They vary slightly from the original description in the following features: observed specimens have 12 branchial filaments and subacicular hooks starting on chaetiger 24, whereas the holotype (see Fauchald, 1992) has up to 8 branchial filaments and subacicular hooks starting on chaetiger 27.

**Distribution.** Amphiamerican in tropical waters, and known from the eastern Pacific near Panama. This is the first record from the Atlantic.

**Eunice pellucida** Kinberg, 1865

*Eunice pellucida* Fauchald, 1992: 261, Fig. 87 a-f; Carrera-Parra and Salazar-Vallejo, 1998a: 1507.

**Material examined.** 1 specimen. Hornos Reef, Stn. PI -1 (1), 14 July 2002.

**Distribution.** Caribbean, from St. Thomas Island. This is the first record from Mexican littoral regions.

**Eunice romanvivesi** n. sp. (Fig. 1)


**Description.** Holotype complete, with 70 chaetigers, 15 mm long, 1 mm wide including parapodia, and yellowish in colour. Prostomium rounded anteriorly, longer than wide. Median sulcus not seen. One pair of rounded black eyes posterior to palps and lateral to the bases of lateral antennae. Ceratophores ring-shaped in all antenniform structures. Palps and antennae with cylindrical articulations basally, becoming drop-shaped distally. Middle antenna longer, reaching chaetiger 5, with 7 articulations; right lateral antenna with 5 articulations, left one with 4; palps with 2 and one, respectively. First ring of peristomial two thirds of total peristomial length. One pair of short and smooth peristomial cirri, reaching middle part of first peristomial ring (Fig. 1A). First parapodium smaller than others. Dorsal cirri digitiform not articulated, longer than ventral cirri in all chaetigers. Ventral cirri conical on anterior parapodia (Fig. 1B), and digitiform in the middle and...
posterior ones (Fig. 1C). Branchiae from chaetiger 4 on left side and from chaetiger 5 on right side, to chaetiger 14. Up to 4 branchial filaments until chaetiger 7.

Limbate chaetae marginally serrated. Pectinate chaetae with 9 - 10 heterodont teeth present from anterior parapodia, (Fig. 1D). Anterior parapodia with bidentate falcigers, those of first chaetiger smaller (Fig. 1E, F); posterior falcigers bidentate (Fig. 1G), and tridentate, the last one with the primary fang longer, triangular, directed slightly down; secondary fang triangular, directed obliquely distally; tertiary fang small, triangular (Fig. 1H). All shafts slightly wide distally, marginally spinulate. First chaetiger with 3 yellowish aciculae, distally blunt; from chaetiger 2, with aciculae bifid distally (Fig. 1I), some inferior aciculae tapering distally. Subacicular hooks present from chaetiger 11, 2 per chaetiger, one long and one short, tridentate, yellowish, and hooded (Fig. 1J, K).

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Fig. 1. – *Eunice romanvivesi* n. sp.: A, anterior end, dorsal view; B, chaetiger 10, in anterior view; C, chaetiger 25, in anterior view; D, pectinate chaeta; E, compound falciger from chaetiger 1; F, compound falciger from chaetiger 10; G, compound falciger from chaetiger 25; H, compound falciger from chaetiger 25; I, acicula from chaetiger 10; J, subacicular hook from chaetiger 25; K, subacicular hook from same chaetiger. Scale bars: A = 0.5 mm; B-C = 150 μm.
Pygidium with terminal anus and 4 anal cirri, dorsal ones larger.

Maxillae not seen on holotype. The paratype (UANL 6328) has the following arrangement: MxI= 1+1; MxII= 5+5; MxIII= 7+4; MxIV= 8+10; and MxV= 1-1. Maxillae III like an arch, not covered by Maxillae II. Maxillae are yellow and soft.

*Etymology.* The species name is to recognize the valuable support of Miguel Angel Roman-Vives (Aquarium of Veracruz) for the facilities provided during the collection activities in the Marine Park Sistema Arrecifal Veracruzano, Veracruz-Anton Lizardo.

*Remarks.* One of the main diagnostic characters of *Eunicus romanvivesi* n. sp. is the presence of tridentate falcigers. Others species with this kind of chaetae are *Eunicus aequalis* (Grube, 1878) from Australia, *Eunicus aucklandica* Avernice (1974) from the Antarctic Ocean, *Eunicus elseyi* (Baider, 1869) from Australia, *Eunicus havaica* (Kinberg, 1865) from Hawaii, *Eunicus martensi* (Grube, 1878) from the Philippines and *Eunicus miurai* Carrera-Parra & Salazar-Vallejo (1998b) from the Mexican Caribbean. Only *E. aucklandica*, *E. havaica* and *E. miurai* have both bi- and tridentate falcigers along the body like *E. romanvivesi*. *Eunicus aucklandica* and *E. havaica* differ from *E. romanvivesi* mainly in the shape of the acicula and the beginning of subacicular hooks; *E. aucklandica* and *E. havaica* have straight aciculae, tapering and blunt, and subacicular hooks appearing from chaetiger 18 and 19-23 respectively, while *E. romanvivesi* has hammer-headed aciculae, and subacicular hooks from chaetiger 11. *Eunicus miurai* differs mainly from *E. romanvivesi* in having articulated peristomial and dorsal cirri, while these characters are smooth in the new species.

*Distribution.* *Eunicus romanvivesi* is only known from the Hornos and Pajaros Reefs in front of Veracruz Harbour.

**Eunicus unifrons** (Verrill, 1900)

*Leodice unifrons* Treadwell, 1921; Figs. 21-30, pl. 1, Figs. 5-9. *Eunicus unifrons* Fauchald, 1992: 330-332, Fig. 113 a-j; Carrera-Parra & Salazar-Vallejo, 1999: 1506, Fig. 14 A-G; Salazar-Vallejo & Carrera-Parra, 1999: 1483, Fig. 1 f-h.


*Distribution.* In tropical, subtropical and warm temperate waters, the Red Sea, Mediterranean Sea, and the Indian, Atlantic and Pacific Oceans. In Mexico this species is known from Baja California Sur, Revillagigedo Islands, Nayarit and Guerrero in the Pacific, and from Veracruz, Campeche and Quintana Roo in the Atlantic.

**Marphysa aransensis** Treadwell, 1939

*Marphysa aransensis* Treadwell, 1939: 5, Figs. 16-17; Hartman, 1956: 285; Salazar-Vallejo et al., 1987: 33; Salazar-Vallejo and Carrera-Parra, 1998: 1485, Fig. 3 a-e.


*Distribution.* This species was originally described from Port Aransas, Texas. In Mexico this
species is known from Tamaulipas and Quintana Roo. This is the first record from Veracruz.

**Marphysa longula** (Ehlers, 1887)

*Paramarphysa longula* Ehlers, 1887: 99, Pl. 29, Figs. 3-12; Rioja, 1960: 302; Nuñez et al., 1998: 66, Fig. 13 a-h. *Marphysa longula* Salazar-Vallejo and Carrera-Parra, 1998: 1489, Fig. 5 f-j.


**Distribution.** Amphiatlantic. Known from the Canary Islands, Cape Verde Islands, Senegal, Gulf of Guinea, Cuba, Bermuda and Florida. In Mexico this species is known from Veracruz, Yucatan and Quintana Roo in the Atlantic.

**Marphysa veracruzensis** n. sp.

(Figs. 2, 3)


**Description.** Holotype complete, with 239 chaetigers, 63 mm long, 1.3 mm wide excluding parapodia, and yellowish iridescent color. Prostomium longer than wide, with a pair of subtriangular superior lips, and median sulcus. Ceratophores ring-shaped in all antenniform structures. Palps and antennae slightly wrinkled. Middle antenna reaches chaetiger 4, lateral antennae reach chaetiger 3, short palps reach chaetiger 1. One pair of black reniform eyes between
lateral antennae and pulps. First ring of peristomium about two thirds of total peristomial length (Fig. 2A). No peristomial cirri.

First parapodia smaller than the others (Fig. 2B). Dorsal cirri smooth, always longer than ventral cirri. Postchaetal lobe rounded on first chaetigers (Figs. 2B-C), anterior-middle lobes becomes almost triangular (Figs. 2D-E), posterior lobes not observed (Figs. 3A-B). Ventral cirri absent on posterior parapodia. Pectinate branchiae, with up to 3 filaments, from chaetiger 33 to chaetiger 185, more developed from chaetiger 100.

Limbate chaetae marginally serrated. Pectinate chaetae present from middle parapodia, with 17-18 teeth, heterodont (Fig. 3C); posterior ones isodont with 14 teeth (Fig. 3D). Anterior parapodia with bidentate falcigers of 3 sizes: a longer one, with the lateral tooth shorter than the distal tooth (Fig. 3E); the middle and small sizes with a lateral and distal tooth triangular, subequal (Figs. 3F-G); all blades with slightly serrated hood. Falcigers on middle and posterior parapodia have only those with a small blade. Shaft slightly wide distally, marginally spinulate. One acicula per parapodium on anterior chaetigers, transitioning to 3 thin aciculae around chaetiger 20. The middle to posterior chaetigers with one acicula per parapodium, blunt-headed, honey-coloured, and darker toward posterior end (Fig. 3H). Subacicular hooks yellowish and bidentate, with hood, present from parapodia 29, and always single. Distal tooth shorter than lateral tooth (Fig. 3I).

![Fig. 3. - Marphysa veracruzensis n. sp.: A. chaetiger 100, in anterior view; B, chaetiger 160, anterior view; C, pectinate chaetae from middle parapodium; D, pectinate chaeta from posterior parapodium; E, F, G, compound falciger from chaetiger 10; H, acicula from chaetiger 50; I, subacicular hook from chaetiger 160. Scale bars: A-B = 150 μm; C-I = 15 μm.](image-url)
Two pairs of anal cirri present; dorsal pair as long as last four chaetigers, ventral pair only an eigth of the length of the dorsal pair.

Maxillae decalcified, yellow with black margin, maxillary formula: MxI=1+1, MxII=3+3, MxIII=6+0, MxIV=6+7, MxV=1+1.

**Etymology.** The species name is taken from Veracruz, the state from which the type locality is described.

**Remarks.** The specimens of *Marphysa veracruzensis* vary in some characters: branchiae beginning on chaetiger 17 to 39, maximal number of branchial filaments 2-3, and subacular hooks starting on chaetiger 24 to 34. All specimens have maxillary decalcified apparatus, with the same formula as the holotype. Only 4 specimens with differences on maxillae II (4+4), and another one with differences on maxillae IV (5+8) were seen. The differences between the beginning of the branchiae and subacular hooks could be due to differences in the size of the specimens.

*Marphysa veracruzensis* belongs to a group of species with few branchial filaments and compound chaetae consisting of only bidentate falcigers. The most closely related species are *Marphysa esco- barae* Salazar-Vallejo and Carrera-Parra (1998b), *Marphysa posterobranchiata* Day (1962) and *Marphysa regalis* Verrill (1900). *Marphysa esco- barae* and *M. regalis* have unidentate subacular hooks from chaetiger 17 and 21, respectively. *Marphysa posterobranchiata*, like *M. veracruzensis* has bidentate subacular hooks present. Both species differ mainly in the start position of the branchiae, the maximum number of branchial filaments, the maxillary formula and the type of pectinate chaetae. *Marphysa posterobranchiata* has branchiae present from chaetiger 84 in a short length of the body, with only one branchial filament; Maxillae II= 5+5, Maxillae IV= 5+10; with only isodont pectinate chaetae. *M. veracruzensis*, on the otherhand, has branchiae beginning from chaetiger 33 in the holotype, but varying in other specimens between chaetigers 17-39; Maxillae II= 3+3, Maxillae IV = 6+7, and pectinate chaetae of two types, heterodont anteriorly and isodont posteriorly.

**Distribution.** Villa del Mar Beach, Boquilla de Oro, Villa Rica, and Sacrificios Island, and Veracruz, Mexico.
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