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Eunicidae (Polychaeta) species in and around İskenderun Bay (Levantine Sea, Eastern Mediterranean) with a new alien species for the Mediterranean Sea and a re-description of *Lysidice collaris*

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Abstract: This study comprises the Eunicidae (Polychaeta) species from İskenderun Bay and surrounding waters (Levantine Sea, Eastern Mediterranean). Benthic material was obtained from 25 stations from 0 to 100 m depths in September 2005. Ten species and 639 individuals belonging to 5 genera were found. Most of the individuals (65%) were determined among rocks and algae. *Palola valida* for the Mediterranean Sea, *Eunice antennata* and *Lysidice margaritacea* for the Levantine Sea, and *E. vittata*, *Marphysa bellii*, and *M. sanguinea* for the Levantine coast of Turkey are new records. *Eunice antennata* and *P. valida* were introduced from the Red Sea and appear to have been well established in the area, constituting 57% of eunicids inhabiting crevices of rocks. *Lysidice collaris* is re-described on the basis of type material, and *E. antennata, L. margaritacea*, and *P. valida* are fully described.

Key words: Eunicidae, alien species, Lessepsian, Levantine Sea, Eastern Mediterranean

İskenderun Körfezi (Levantin Denizi, Doğu Akdeniz) ve civarındaki Eunicidae (Polychaeta) türleri ile Akdeniz için yeni bir yabancı tür ve *Lysidice collaris*'in yeniden tanımlanması

Özet: Bu çalışma İskenderun Körfezi (Levantin Denizi, Doğu Akdeniz) ve civarında yayılış gösteren Eunicidae türlerini kapsamaktadır. Bentik materyal 0-100 m derinliklerde yer alan 25 istasyondan Eylül 2005 tarihinde alınmıştır. Beş cinse ait toplam 10 tür ve 639 birey tespit edilmiştir. Bireylerin çoğunluğu (% 65) kayalık ve algler üzerinde bulunmuştur. Saptanan türlerden *Palola valida* Akdeniz için, *Eunice antennata* ve *Lysidice margaritacea* Levantin Denizi için, *E. vittata*, *Marphysa bellii* ve *M. sanguinea* ise Türkiye'nin Levantin Denizi kıyıları için yeni kayıtlardır. *Eunice antennata* ve *P. valida* Kızıldeniz türleri olup, kayaların yarıklarından toplanan eunicid bireylerinin % 57'sini kapsamaktadırlar. Bu türlerin bölgeye çok iyi uyum sağladıkları görülmektedir. *Lysidice collaris*'in tip örneğinin tanımı ile *E. antennata, L. margaritacea* ve *P. valida*'nın tanımları verilmiştir.

Anahtar sözcükler: Eunicidae, yabancı tür, Lessepsian, Levantin Denizi, Doğu Akdeniz

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Introduction

Eunicid polychaetes are large worms commonly living in crevices of rocks and corals and among algae in shallow waters, occasionally inhabiting soft bottoms (Fauchald, 1992a). Almost 300 species belonging to 9 genera have been reported worldwide (Beesley et al., 2000) and 22 species from 6 genera occur in the Mediterranean Sea (author's database). The first eunicid reported from the Turkish coasts was *Palola siciliensis* (Colombo, 1885) and 13 species have been reported since then (Ostroumoff, 1896; La Greca, 1949; Rullier, 1963; Geldiay and Ergen, 1970; Ergen, 1976; Çinar and Ergen, 1998, 1999a; Gillet and Unsal, 2000). Fourteen eunicid species have also been reported from the coasts of the Levantine Sea (Ben-Eliahu, 1995), but only 5 (*Lysidice collaris, L. ninetta, Marphysa fallax, Nematonereis unicornis* and *P. siciliensis*) were found on the Turkish coast of the Levantine Sea (Ergen and Çinar, 1997; Ergen et al., 1998).

The Levantine coast of Turkey is known to be densely colonized by numerous Lessepsian migrants (Çinar et al., 2005), including polychaetes, the importance of which in benthic communities has been recently documented (Ergen and Çinar, 1997; Çinar and Ergen, 1999b; Çinar, 2006). Within the eunicids, 2 alien species have been previously reported from the Mediterranean Sea: *Eunice antennata* and *Lysidice collaris*. However, the latter has been regarded as questionable (Çinar et al., 2005; Zenetos et al., 2005) as its taxonomic status in the Mediterranean Sea has not been resolved (Çinar, 2005).

The present paper deals with the eunicids from İskenderun Bay and its surrounding waters, particularly focusing on its morphology, ecology, and reproduction.

Materials and methods

A total of 62 benthic samples were collected at 25 stations in and around İskenderun Bay, NE Levantine Sea (Figure 1), on soft substrata (mud, sand, muddy sand, sandy mud), bare rocks, beds of *Jania rubens* (Linnaeus) Lamouroux, *Cystoseira elegans* Sauvageau and the alien mussel *Brachidontes pharaonis* (Fisher, 1870), colonies of the coral *Cladocora caespitosa* (Linnaeus, 1767), and the sponge *Sarcotragus* sp. from 0 to 100 m deep (Table). Samples were collected by scuba diving and snorkeling in shallow waters (0-5 m deep), and by a van Veen grab and anchor dredge in deeper waters (5-100 m deep). In algae and mussel beds, 3 replicates were taken with a quadrate of 20 × 20 cm. The samples were sieved through 0.5 mm mesh and the retained material was placed in separate jars containing a 4% seawater formaldehyde solution. In the laboratory, samples were rinsed with fresh water, sorted according to taxonomic groups under a stereomicroscope, and preserved in 70% ethanol. The eunicid polychaetes were then identified and counted.

For each species, body length, width at chaetiger 10 and length of blades of falciger chaetae were measured with an ocular micrometer in the largest specimen. The maxillary apparatus was extracted after dissection. Photographs were taken with a digital camera (Olympus, Camedia, C7070) attached to stereo and compound microscopes. Terminology for descriptions of the species follows Fauchald (1992a).

The type specimens of *Lysidice collaris* deposited at Berlin Museum of Natural History (ZMB), and the specimens of *Eunice antennata* collected from the Suez Canal and deposited at the Natural History Museum, London (NHM) were examined and compared to the Turkish Levantine specimens.

All examined specimens are deposited at the Museum of Faculty of Fisheries, Ege University (ESFM), Turkey.

Results

A total of 639 eunicid individuals belonging to 10 species and 5 genera have been identified. Among them, *Palola valida* is a new species to the Mediterranean fauna, *Eunice antennata* and *Lysidice margaritacea* to the Levantine fauna and 3 species (*Eunice vittata, Marphysa bellii* and *M. sanguinea*) to the fauna of the Levantine coast of Turkey.

Taxonomic account

***Eunice antennata* (Savigny, 1820)**

Eunice antennata Savigny, 1826: 380-381, pl. 5, Figure 1.1-27; Crossland, 1904: 312, pl. 22, Figures 1-7; Fauvel, 1921: 15-16; Monro, 1924: 53-54; Pillai,

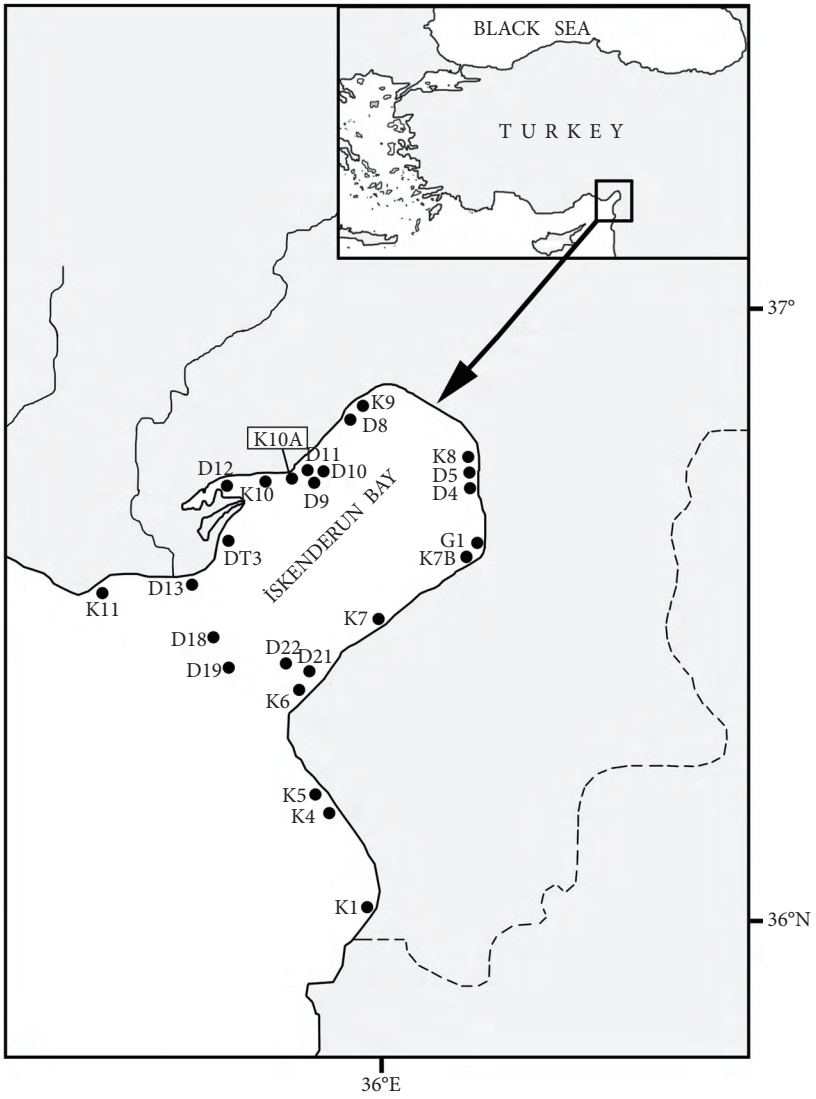

Figure 1. Map of the study area, indicating the position of sampling stations.

1965: 148-150, Figure 15; Day, 1967: 384, Figure 17.2k-q; Hartman, 1968: 711, Figures 1-5; Fishelson and Rullier, 1969: 73; Miura, 1977a: 7-9, Figure 3; Amoureux, et al., 1978: 91; Gathof, 1984: 23-25, Figure 40-20; Fauchald, 1992a; 57-60, Figure 11; Carrera-Parra and Salazar-Vallejo, 1998a: 1500, Figure 1a-e.

Eunice sp. Ergen and Çinar, 1997: 235.

Material examined. ESFM-POL/2005-1821, K1a, 14 specimens; ESFM-POL/2005-1822, K1b, 5 specimens; ESFM-POL/2005-1823, K4, 6 specimens; ESFM-POL/2005-1824, K5a, 18 specimens; ESFM-POL/2005-1825, K5c, 1 specimens; ESFM-POL/2005-1826, K5b, 4 specimens; ESFM-POL/2005-1827, K6a, 81 specimens; ESFM-POL/2005-1828, K6b, 5 specimens; ESFM-POL/2005-1829, K7a, 1 specimen; ESFM-POL/2005-1830, K7b, 13 specimens; ESFM-POL/2005-1831, K7Ba, 1 specimen; ESFM-POL/2005-1832, K8b, 5 specimens; ESFM-POL/2005-1833, K8a, 11 specimens; ESFM-POL/2005-1834, K9c, 20 specimens; ESFM-POL/2005-1835, K10a, 11 specimens; ESFM-POL/2005-1836, K10b, 1 specimen; ESFM-POL/2005-1837, K10Aa, 2 specimens; ESFM-

Table. Date, coordinates, depth and biotope of stations in and around İskenderun Bay

Station	Date	Coordinates		Depth (m)	Biotope
		Latitude, °N	Longitude, °E		
K1	12.09.2005	36°00'36"	35°58'34"	0-5	Rock (K1a)
				3	*Jania rubens* (K1b)
K4	11.09.2005	36°07'37"	35°55'00"	0.5	Rope and tyres (K4)
K5	12.09.2005	36°08'30"	35°54'30"	0.3-3	Rock (K5a)
				0.3	*J. rubens* (K5b)
				0.3	*Brachidontes pharaonis* (K5c)
K6	13.09.2005	36°19'30"	35°47'00"	0-3	Rock (K6a)
				0.1	*Cystoseira elegans* (K6b)
				2	*Sarcotragus* sp. (K6c)
K7	13.09.2005	36°31'36"	36°02'03"	0-3	Rock (K7a)
				1	*C. elegans* (K7b)
K7B	09.09.2005	36°35'32"	36°10'20"	0.1	*Padina pavonica* (K7Ba)
K8	14.09.2005	36°45'40"	36°11'58"	0-3	Rock (K8a)
				1	*C. elegans* (K8b)
				1-3	*Cladocora caespitosa* (K8c)
K9	14.09.2005	36°54'22"	35°58'05"	0.1-2	Rock (K9a)
				1	*Sarcotragus* sp. (K9b)
				0.1-3	Harbor pilings (K9c)
K10	15.09.2005	36°45'59"	35°47'18"	0.1-3	Rock (K10a)
				0.5	*J. rubens* (K10b)
K10A	09.09.2005	36°45'59"	35°47'32"	0.1-0.3	Rope, dock and tyres (K10Aa)
K11	15.09.2005	36°33'20"	35°22'44"	0.1-3	Rock (K11a)
				1	*J. rubens* (K11b)
				1	Sand (K11c)
G1	09.09.2005	36°35'37"	36°11'09"	8	Mud (G1)
D4	09.09.2005	36°43'32"	36°10'03"	25	Rock (D4a)
				25	Muddy sand (D4b)
D5	09.09.2005	36°43'03"	36°11'28"	11	Gravel (D5)

Table 1. (continued)

Station	Date	Coordinates		Depth (m)	Biotope
		Latitude, °N	Longitude, °E		
D8	09.09.2005	36°51'49"	35°55'01"	10	Mud with *Caulerpa prolifera* (D8)
D9	09.09.2005	36°45'59"	35°48'18"	25	Stone (D9a)
				25	Sandy mud (D9b)
D10	09.09.2005	36°45'40"	35°48'29"	50	Muddy sand (D10)
D11	10.09.2005	36°46'00"	35°47'45"	10	Sand (D11)
D12	10.09.2005	36°43'37"	35°42'44"	9	Muddy sand (D12)
D13	10.09.2005	36°33'22"	35°34'17"	10	Muddy sand (D13)
D18	10.09.2005	36°23'38"	35°39'26"	100	Mud (D18)
D19	10.09.2005	36°21'15"	35°44'27"	75	Sandy mud (D19)
D21	10.09.2005	36°20'43"	35°48'08"	21	Muddy sand (D21)
D22	10.09.2005	36°20'57"	35°48'43"	10	Sand (D22)
DT3	10.09.2005	36°40'50"	35°42'59"	40	Mud (DT3)

POL/2005-1838, K11c, 1 specimen; ESFM-POL/2005-1839, K11a, 8 specimens; ESFM-POL/2005-1840, K9a, 15 specimens; ESFM-POL/2005-1841, K11b, 5 specimens; ESFM-POL/2005-1842, D21, 5 specimens; ESFM-POL/2005-1843, D22, 2 specimens.

Additional material examined. BM(NH)ZH 1869.7.8.6, Gulf of Suez, presented by R. McAndrew, Esq., 5 specimens; BM(NH)ZH 1926.11.12.139-148, 03.11.1924, Suez Canal Expdn., Savigny, 19 specimens.

Juvenile description. Specimen complete, 4.4 mm long, 0.23 mm wide, with 29 chaetigers. Body cylindrical, tapering and curving towards posterior end. Body pale pink, with dorsal white spots at mid-body. Prostomium frontally rounded, dorsally slightly flattened, ventrally inflated. Median sulcus deep. Prostomium (0.20 mm) nearly as long as peristomium (0.21 mm). Peristomium cylindrical. Peristomial rings distinct. Peristomial cirri non-formed. Antennae in a horse shoe, increasing in length from AI to AIII. Ceratophores ring-shaped, without articulations. Ceratostyles tapering, with moniliform articulations (up to 1 in AI, up to 2 in AII, up to 3 in AIII). Red eyes at AI bases. Branchiae non-formed. Dorsal cirri with 2 short articulations, tapering after chaetiger 4; slender, more tapered after chaetiger 12-13. First ventral cirri short, triangular on chaetigers 2-5. Ventral cirri elongated on middle parapodia; slender on posterior parapodia. Superior chaetae including 2-3 limbate; inferior chaetae including 1-7 compound

heterogomph falciger chaetae. Pectinate chaetae not seen. Limbate chaetae slender, marginally smooth. Compound falciger chaetae bidentate anteriorly; tridentate from chaetiger 12 to posterior chaetigers, distal tooth larger than proximal one. Falciger chaetae with blades from 20 (bidentate) to 25 (tridentate) µm long, shafts swollen, wide and marginally serrated. Pseudocompound falciger and spiniger chaetae absent. Aciculae yellow, paired in many chaetigers, tapering, distally blunt. Subacicular hooks yellow, tridentate with teeth in a crest. Hooks first present from chaetiger 9. Pygidium with 2 short and 2 long anal cirri.

Adult description. Largest specimen complete, 51.4 mm long, 2.4 mm wide, with 121 chaetigers. Body cylindrical, tapering towards posterior end (Figure 2A). Body light pink, with a broad white dorsal band at chaetiger 1 (Figure 2B); with dark orange spots at bases of median and posterior parapodia, often with white dorsal spots at mid-body. Prostomium frontally rounded, dorsally slightly flattened, ventrally inflated. Median sulcus deep. Prostomium (0.6 mm) nearly as long as half of anterior ring (1.3 mm) of peristomium. Peristomium cylindrical, 1.6 mm long, with distinct rings; posterior one as long as following chaetiger. Peristomial cirri reaching mid-anterior ring, tapering, with three long articles. Antennae in a horse shoe, increasing in length from AI to AIII; ceratophores ring-shaped, smooth; ceratostyles tapering, moniliform; with up to 11 (AI), 19 (AII), 25 (AIII) articles; AI extending to anterior peristomial ring, AII to middle chaetiger 1, AIII to chaetiger 3. Eyes black, at AI bases. Maxillary formula: MI (1 + 1), MII (6 + 8), MIII (6 + 0), MIV (6+8), MV (1 + 1). Branchiae, from chaetiger 6 to 120, pectinate, longer than dorsal cirri; 1 filament at first one, up to 8 at chaetiger 13, increasing up to chaetiger 34, decreasing to 2 or 3 up to chaetiger 72, then increasing again to 4-5, last 3 with 3; stems tapering; filaments tapering, similar in size and thickness. Dorsal cirri with 2 or 3 short articles, all tapering after first 4 chaetigers, slender after chaetiger 12-13. First ventral cirri short, triangular at chaetiger 2-5; inflated basally after chaetiger 5; elongated, digitiform on middle parapodia; slender, digitiform on posterior parapodia. Superior chaetae including 2-4 limbate and 4-8 pectinate chaetae; inferior chaetae including 2-6 compound heterogomph falciger chaetae. Limbate chaetae slender, marginally smooth; pectinate chaetae heterodont, marginal teeth longer than others, shafts wide, thin, with 13-15 teeth; compound falciger chaetae bidentate, distal tooth larger than proximal, blade 68.75 µm long (Figure 2C); shafts inflated, wide, marginally serrated. Pseudocompound falciger and spiniger chaetae absent. Aciculae yellow, paired in many chaetigers, tapering, distally blunt. Subacicular hooks yellow, tridentate with teeth in a crest (Figure 2D), first present from chaetiger 26. Pygidium with 2 short (1.7 mm, 6 articles) and 2 long (0.4 mm, 2 articles) anal cirri.

Ecology. Most specimens were found among crevices of rocks and on artificial substrata such as harbor pilings, ropes, docks and tires, but they also occurred among algae, mussel beds (*Brachidontes pharaonis*), sandy mud and sand, from 0 to 21 m deep. The maximum density (125 ind. m^{-2}) was found on the alga *Jania rubens* at station K1.

Distribution. Suez Canal, Red Sea, Mediterranean Sea, Atlantic Ocean, Pacific Ocean, Indian Ocean (Savigny, 1826; Cantone, 1993; Day, 1967; Amoureux et al., 1978; Carrera-Parra and Salazar-Vallejo, 1998a).

Remarks. The specimens from ESFM (Antalya Bay, collected in July 1993) previously identified as *Eunice* sp. (Ergen and Çinar, 1997), belongs to *Eunice antennata*, this indicating the presence of the species in the area before our study.

To define the possible changes in morphology and chaetal arrangement, juveniles of different lengths from the same population were examined. Some of them had 3 antennae rather than 5, a lower number of articles in antennae and both bidentate and tridentate falciger chaetae. However, they had a color pattern similar to that of adults, with a white band on chaetiger 1, orange spots on posterior parapodia and white dorsal spots at mid-body. Juveniles and adults shared the same types of chaetae (bidentate compound falciger, smooth limbate and heteredont pectinate chaetae, as well as yellow tridentate subacicular hooks) except for the tridentate compound falciger chaetae (Figure 2E), which were present in all juveniles of *Eunice antennata* in the middle and posterior regions, and were absent in specimens longer than 40 mm (Figure 3A). This size-

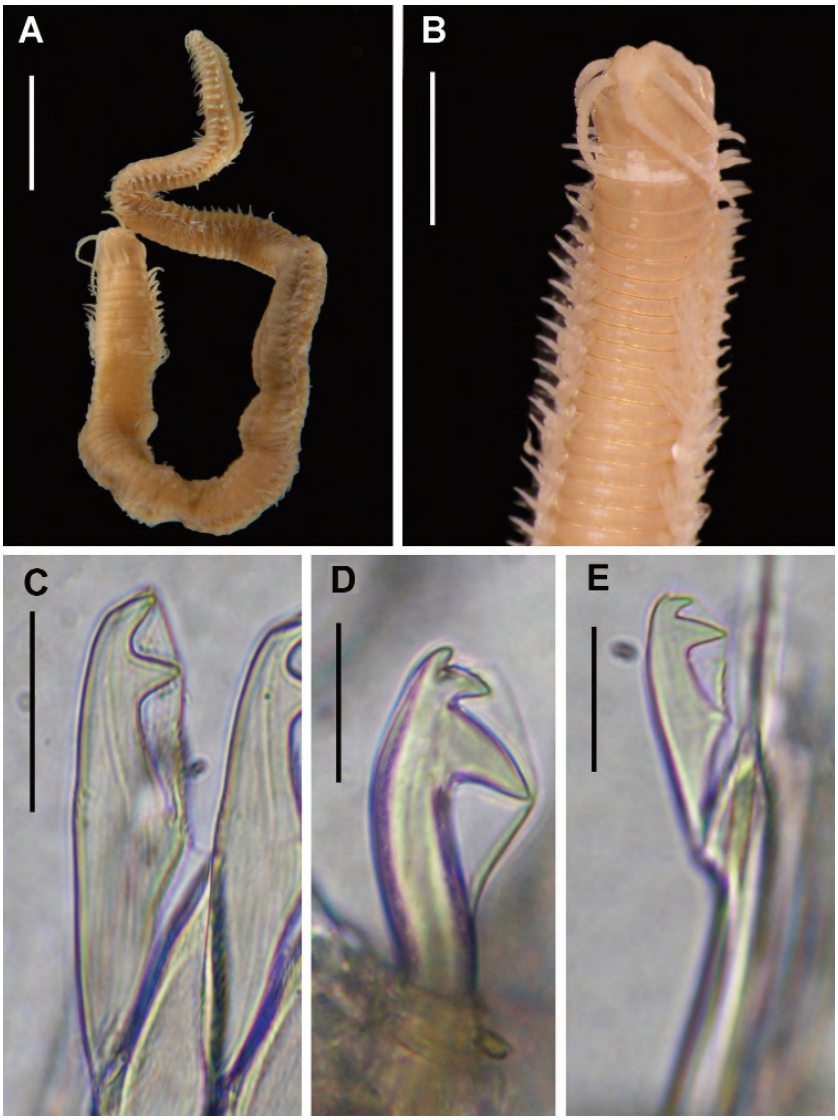

Figure 2. *Eunice antennata* (ESFM-POL/2005-1827). A. Entire body. B. Anterior end, dorsal view. C. Bidentate compound falciger chaetae from chaetiger 5. D. Subacicular hook from chaetiger 61. E. Tridentate compound falciger chaeta from chaetiger 20 (ESFM-POL/2005-1830). Scale bars: A 5 mm, B 2 mm, C 30 µm, D 30 µm, E 15 µm.

related feature, reported for the first time in eunicids, coincides with a significantly positive relationship between the first occurrence of this chaetal type and body length ($P < 0.05$) (Figure 3B). Together with an increase in size, the tridentate falciger chaetae tended to disappear from parapodia, and only bidentate falciger chaetae remained.

The eunicids with tridentate falciger chaeta are *Eunice aequabilis* (Grube, 1878) from Australia, *Eunice elseyi* (Baird, 1869) from Australia, *Eunice martensi* (Grube, 1878) from the Philippines, *Eunice aucklandica* (Avernicev, 1974) from the Antarctic Ocean, *Eunice havaica* (Kinberg, 1865) from Hawaii, *Eunice miurai* Carrera-Parra and Salazar-Vallejo,

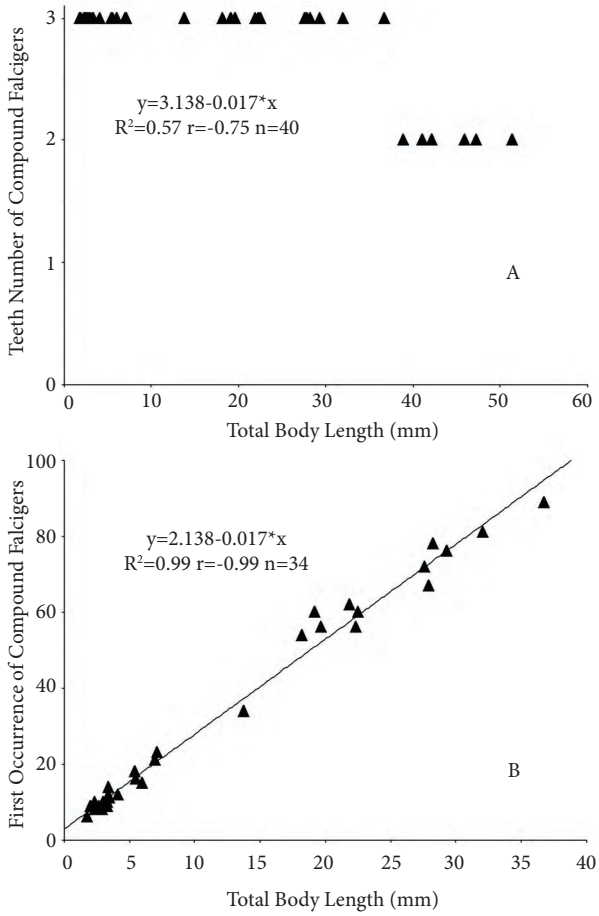

Figure 3. *Eunice antennata*. A. Presence of tridentate and bidentate falciger chaetae in relation with body length (n = 40, P < 0.05). B. Relationship between the chaetiger of the first occurrence of a tridentate compound falciger chaetae and body length (n = 34, P < 0.05).

1998b from the Mexican Caribbean, and *Eunice romanvivesi* León-González and Castañeda, 2006 from the Gulf of Mexico. The last 4 have both bidentate and tridentate falciger chaetae, their descriptions were based on small specimens (15 mm, 25 mm, 30 mm and 15 mm long, respectively), and have yellow tridentate subacicular hooks (Fauchald, 1992a; Carrera-Parra and Salazar-Vallejo, 1998b; de León-González and Castañeda, 2006).

Eunice havaica synonymized of *E. antennata* by Hartman (1948) (see Fauchald, 1992a) but Fauchald (1992a) considered it a distinct species. As other features such as branchiae, antennae and subacicular hooks coincide with *E. antennata*, our findings indicate that *E. havaica* could certainly be a juvenile of *E. antennata*. *Eunice miurai* is the only species with both bidentate and tridentate compound falciger chaetae on the anterior and posterior chaetigers (Carrera-Parra and Salazar-Vallejo, 1998b). This diagnosis matches well with that of the juveniles of *E. antennata* reported here. We thus postulate that the small *Eunice* species with tridentate compound falciger chaetae might be juveniles of other *Eunice* species present in the area. Therefore, descriptions of *Eunice* species based on small immature specimens might lead to incorrect identifications, as juveniles could have characters absent in large mature specimens.

***Eunice vittata* (Delle Chiaje, 1828)**

Eunice vittata Fauvel, 1923: 404, Figures 158h-n; Day, 1967: 385, Figure 17.3a-e; Marinov, 1977: 131, Figures XVII, 3a-e; Miura, 1977b: 11-13, Figure 1; Campoy, 1982: 579-582, Figures LXXIII; Gathof, 1984: 20-23, Figure 40-18; George and Hartmann-Schröder, 1985: 104, Figure 29; Fauchald, 1992a: 337-339, Figure 115a-i; Núñez, et al., 1997: 52-54, Figure 3a-g.

Material examined. ESFM-POL/2005-1811, D4b, 24 specimens; ESFM-POL/2005-1812, D5, 12 specimens; ESFM-POL/2005-1813, D8, 3 specimens; ESFM-POL/2005-1814, D9b, 48 specimens; ESFM-POL/2005-1815, D10, 59 specimens; ESFM-POL/2005-1816, D11, 2 specimens; ESFM-POL/2005-1817, D12, 1 specimen; ESFM-POL/2005-1818, D13, 7 specimens; ESFM-POL/2005-1819, D21, 5 specimens; ESFM-POL/2005-1820, D22, 5 specimens.

Diagnosis. Largest specimen incomplete, 13.8 mm long, 0.95 mm wide, with 52 chaetigers. Body cylindrical, pale. Prostomium with 5 antennae. Peristomial cirri tapering, weakly articulated. Maxillary formula: MI (1 + 1), MII (10 + 10), MIII (9 + 0), MIV (9 + 10), MV (1 + 1). Brachiae from chaetiger 3 to 25, pectinate. Superior chaetae including 2-5 limbate and 2-4 pectinate chaetae; inferior chaetae including 2-6 heterogomph compound falciger chaetae. Subacicular hooks yellow tridentate with teeth in a crest, first present from chaetiger 20. Acicula paired in many chaetigers, yellow, tapering, distally blunt.

Ecology. 97% of the specimens were juveniles and found only on soft bottoms 9-50 m deep.

Distribution. Black Sea, Mediterranean Sea, Atlantic Ocean, Pacific Ocean, Indian Ocean (Fauvel, 1923; Day, 1967; George and Hartmann-Schröder, 1985).

***Lysidice collaris* Grube, 1870**

Lysidice collaris Grube, 1870: 495; Gravier, 1900: 272, pl. 14, Figures 93-95; Day, 1967: 402-403, Figure 17.8a-f; Martin, 1987: 66-68, Figure 4a-h.

Material examined. Syntype (ZMB # 503), Museum für Naturkunde, Berlin, Gr. 1870, Location: Tor; Leg: Ehrenberg, 2 specimens; Syntype (ZMB # Q 3361), Museum für Naturkunde, Berlin, Location: Rotes Meer, Collect: Grube, 1 specimen.

Description. Syntypes in very poor condition. Large specimen (ZMB # 503) complete, broken in 2 parts, 82.2 mm long, 1.90 mm wide, with 224 chaetigers. Body cylindrical, dorsally inflated. Body pale brown, brightly iridescent (Figure 4A). Prostomium bilobed, with 3 antennae slightly, irregularly articulated, similarly thick and long (0.8 mm), all reaching prostomial front. Prostomium as long as peristomium (0.9 mm). Peristomium with 2 rings, first one twice as long (0.6 mm) as second one

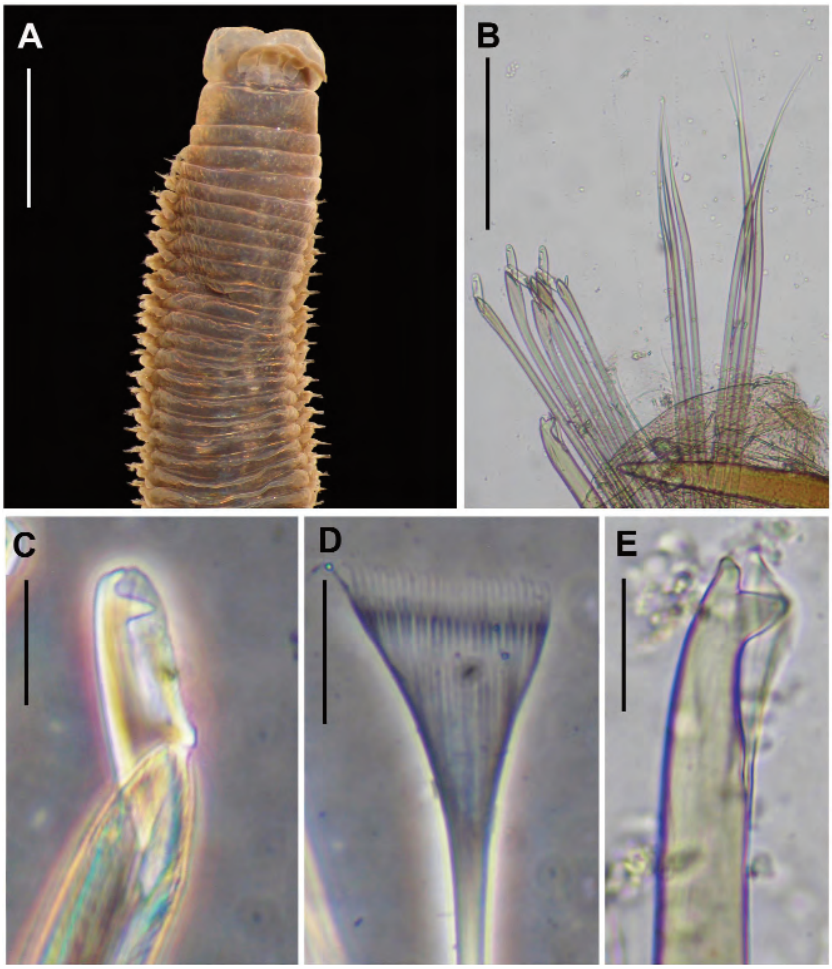

Figure 4. *Lysidice collaris* (ZMB, # 503). A. Anterior end, dorsal view. B. Limbate chaetae and compound falciger chaetae, subacicular hook and acicula from chaetiger 25. C. Compound falciger chaeta from chaetiger 25. D. Pectinate chaeta from chaetiger 30. E. Subacicular hook from chaetiger 25. Scale bars: A 2 mm, B 100 µm, C 10 µm, D 20 µm, E 20 µm.

(0.3 mm). Eyes absent at syntype. Maxillae dark brown; maxillary formula: MI (1 + 1), MII (4 + 4), MIII (4 + 0), MIV (3 + 5), MV (1 + 1). Anterior dorsal cirri digitiform, shorter at mid-body; posterior-most smaller, conical. Ventral cirri shorter than dorsal, small, conical, reduced on posterior chaetigers. Branchiae absent. Superior chaetae including 4-7 limbate and 2-4 pectinate chaetae; inferior chaetae including 4-6 compound heterogomph falciger chaetae. Limbate chaetae distally slender, marginally smooth, present on all chaetigers (Figure 4B). Compound falciger chaetae bidentate (Figure 4C), distal tooth thin, smaller than proximal one; blade 25 µm long; shafts inflated, marginally serrated. Pectinate chaetae anadont, shafts wide with 25-28 fine teeth, similar in size (Figure 4D). Bidentate subacicular hooks (Figure 4E) from chaetiger 20, amber. One acicula per parapodium, brown with pale blunt tip. Two anal cirri.

Distribution. Apparently cosmopolitan in tropical and temperate regions (Ben-Eliahu, 1976; Martin, 1987). Not found in the studied area.

***Lysidice margaritacea* Claparède, 1868**

Lysidice margaritacea Claparède, 1868: 143-144, pl. 3, Figure 3a-d.

Material examined. ESFM-POL/2005-1787, K9c, 1 specimen; ESFM-POL/2005-1788, K6a, 38 specimens; ESFM-POL/2005-1789, K6b, 2 specimens; ESFM-POL/2005-1790, K1a, 57 specimens; ESFM-POL/2005-1791, K10a, 18 specimens.

Description. Largest specimen complete, 57.4 mm long, 1.43 mm wide, with 170 chaetigers. Body cylindrical, dorsally inflated, ventrally slightly flattened; pale pink to pale orange, iridescent (Figure 5A). Prostomium distinctly bilobed. Three antennae with swollen bases, smooth, tapering, similarly thick; median one slightly longer (0.5 mm) than lateral one (0.4 mm); all reaching prostomial front. Prostomium shorter (0.5 mm) than peristomium (0.4 mm). Peristomium with 2 rings, first one as long as second one. Eyes reniform, black, at bases of lateral antennae. Maxillary formula: MI (1 + 1), MII (4 + 3), MIII (3 + 0), MIV (2 + 4), MV (1 + 1). Anterior dorsal cirri digitiform, then conical. Ventral cirri shorter than dorsal ones, small, triangular. Posterior dorsal and ventral cirri reduced to small swellings. Branchiae absent. Superior chaetae including 2-4 limbate and 2-5 pectinate chaetae; inferior chaetae including 3-6 compound heterogomph falciger chaetae. Limbate chaetae on all chaetigers, tapering, distally slender, curved, marginally smooth (Figure 5B). Compound falciger chaetae bidentate (Figure 5C); distal tooth slightly curved, longer than proximal one; blade 17.5 µm long; shafts slightly inflated, marginally slightly serrated. Pectinate chaetae anadont; shafts wide with 15-20 coarse teeth; similar in size (Figure 5D). Bidentate subacicular hooks (Figure 5E) from chaetiger 23, amber. Acicula amber, one per parapodium, with blunt tip (Figure 5F). Anal cirri not seen.

Reproduction. Ten specimens had coelomic oocytes in the posterior region. The oocytes were white, ranging from 125 to 300 µm in diameter (n = 90, 210.8 ± 4.41 µm on average) (Figure 5G). Mature females of *L. collaris* were reported as bearing eggs 85-200 µm in diameter, while those of *L. ninetta* had eggs 50-200 µm in diameter (Gambi and Cigliano, 2006). Although the size of oocytes strongly depends on the phase of the life cycle of the females, the Turkish Levantine specimens of *L. margaritacea* seemed to have oocytes distinctly larger than those of Italian *Lysidice* species.

Ecology. Particularly inhabits crevices of rocks between 0 and 5 m deep, but also on harbor pilings and among *Cystoseira elegans*. The maximum density (50 ind.m^{-2}) occurred at station K6.

Distribution. Mediterranean Sea (Claparède, 1868).

Remarks. Lysidice margaritacea was described from the Gulf of Naples (Claparède, 1868) and subsequently synonymized with *L. ninetta* (Fauvel, 1923). However, it closely resembles *L. collaris* rather than *L. ninetta* in the shape of eyes and prostomium, and body coloring. As the main features (type of chaetae, shape of prostomium and eyes) of *L. margaritacea* are similar to those of *L. collaris*, it was suggested that previous Mediterranean reports of the latter might in fact belong to the former (Çinar, 2005). According to our observations, the syntypes of *L. collaris* have MIII with 4 teeth and pectinate chaetae with 25-28 fine teeth, whereas our specimens have MIII with 2 big and 1 small (accessory) teeth and pectinate chaetae with 17-20 coarse teeth. The blades

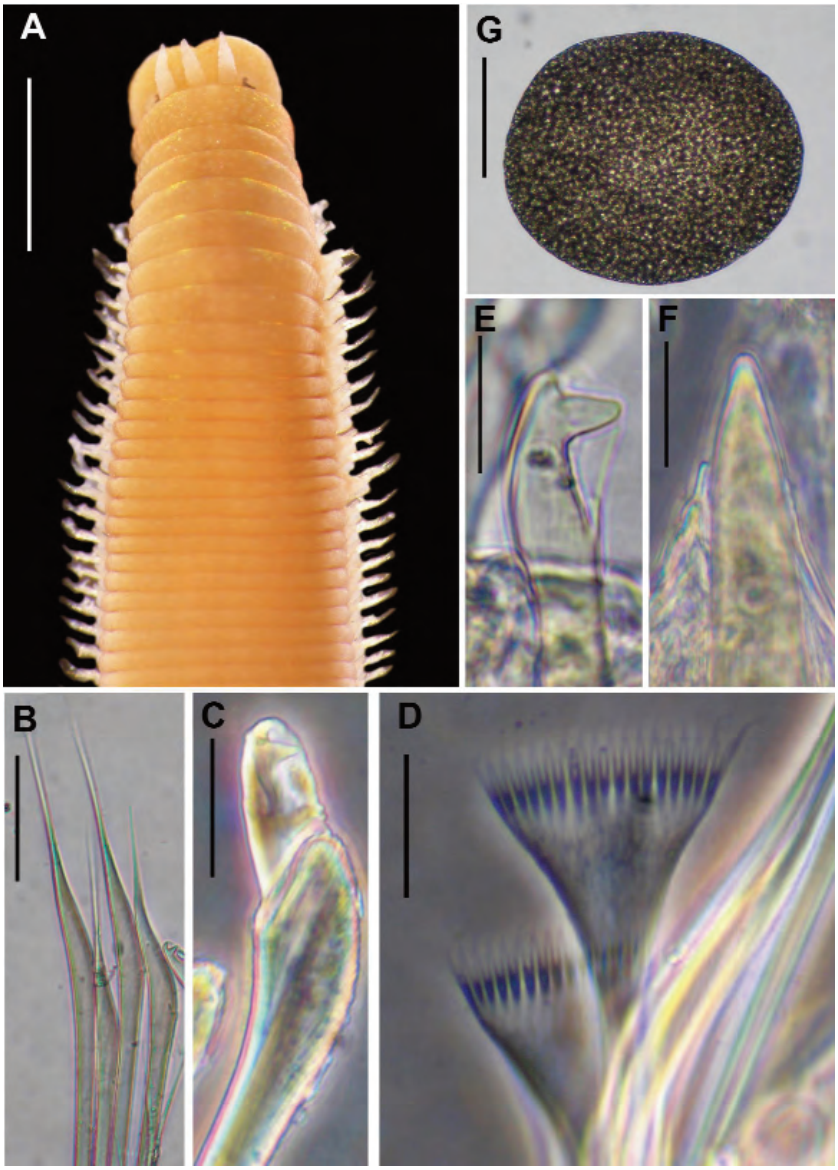

Figure 5. *Lysidice margaritacea* (ESFM-POL/2005-1788). A. Anterior end, dorsal view. B. Limbate chaetae from chaetiger 10. C. Compound falciger chaeta from chaetiger 10. D. Pectinate chaetae from chaetiger 80 (ESFM-POL/2005-1790). E. Subacicular hook from chaetiger 41. F. Acicula from chaetiger 25. G. Egg. Scale bars: A 1.5 mm, B 40 µm, C 15 µm, D 20 µm, E 10 µm, F 10 µm, G 60 µm.

of the compound falciger chaetae of *L. margaritacea* are distinctly shorter (17.5 µm) than those of *L. collaris* (25 µm). The first report of *L. collaris* from the Mediterranean was given by Ben-Eliahu (1972) on the coast of Cyprus and it was considered a Lessepsian migrant. This species was later reported from the Western Mediterranean and the Aegean Sea (Martin, 1987; Sardá, 1991; Çinar and Ergen, 1998). The present study shows that there are not only important differences between our specimens of *L. margaritacea* and *L. ninetta*, so they must not be considered as synonymous, but also with the type specimens of *L. collaris*. In turn, the specimens found in the Western Mediterranean by Martin (1987) and Sardá (1991)

agree with the syntypes of *L. collaris*, except in the shape of the teeth of the subacicular hook, which is arranged in a slightly more acute angle than those of the syntypes. This difference seems insufficient to indicate the possibility of having a fourth, likely new species involved in the problem (as slight differences in the angle of observation might cause this distinction), and so the presence of *L. collaris* can be confirmed in the Western Mediterranean, which also leads us to conclude that the species seems not to be a Lessepsian migrant. Our observations also confirm that *L. margaritacea* is a valid Mediterranean species, which is reported for the Levantine Sea for the first time.

***Lysidice ninetta* Audouin and Milne Edwards, 1833**

Lysidice ninetta Audouin and Milne Edwards, 1834: 161-162, pl. 3b, Figures 1-8; Fauvel, 1923: 411, Figure 162a-f; Day, 1967: 403, Figure 17.8g-i; Marinov, 1977: 133, Figures XVII, 2a-e; Miura, 1977b: 76-79, Figure 7a-n; Amoureux et al., 1978:95; Campoy, 1982: 564-567, Figures LXX; Gathof, 1984: 6-8, Figure 40-4; George and Hartmann-Schröder, 1985: 106, Figure 30; Martin, 1987: 66-68, Figure 4i-l; Núñez et al., 1997: 69, Figure 14; Salazar-Vallejo and Carrera-Parra, 1998: 1483, Figure 1f-h.

Material examined. ESFM-POL/2005-1785, K9b, 1 specimen; ESFM-POL/2005-1786, K6c, 1 specimen.

Diagnosis. Specimen incomplete, 13.2 mm long, 0.95 mm wide, with 71 chaetigers. Body cylindrical, light pink with iridescent pigmentation. Prostomium with 3 antennae. Eyes black; oval to round. Maxillary formula: MI (1 + 1), MII (4 + 4), MIII (4 + 0), MIV (3 + 5), MV (1 + 1). Branchiae absent. Superior chaetae including 1-4 limbate and 1-4 pectinate chaetae; inferior chaetae including 2-4 compound heterogomph falciger chaetae. Subacicular hooks from chaetiger 19, ligth brown, bidentate. Acicula brown, with blunt tip.

Remarks. The 2 specimens found were very small and did not show the characteristic color pattern (with a white band and white spots in anterior segments) described for this species in previous papers (e.g. Martin, 1987), which may possibly appear in adults.

Ecology. This species was found within pores of the sponge *Sarcotragus* sp. at 1-2 m deep.

Distribution. Black Sea, Red Sea, Mediterranean Sea, Atlantic Ocean, Pacific Ocean (Fishelson and Rullier, 1969).

***Marphysa bellii* (Audouin and Milne Edwards, 1833)**

Lysibranchia paucibranchiata Cantone, 1983: 82-84, Figures 1-2.

Marphysa bellii Audouin and Milne Edwards, 1834: 149-151, pl.3 , Figures 1-4; Fauvel, 1923: 410, Figure 161i-q; Pettibone, 1963: 238, Figure 63, a-d; Campoy, 1982: 572-573; Gathof, 1984: 10-12, Figure 40-6; George and Hartmann-Schröder, 1985: 108, Figure 31, Núñez et al., 1997: 63-66, Figure 12; Salazar-Vallejo and Carrera-Parra, 1998: 1486-1487, Figure 3f.

Material examined. ESFM-POL/2005-1795, D4b, 2 specimens; ESFM-POL/2005-1796, D18, 1 specimen; ESFM-POL/2005-1797, D9b, 8 specimens; ESFM-POL/2005-1798, G1, 40 specimens.

Diagnosis. Largest specimen incomplete, 12.4 mm long, 0.80 mm wide, with 47 chaetigers. Body cylindrical, pale. Prostomium oval to round, with 5 antennae. Peristomial cirri absent. Maxillary formula MI (1 + 1), MII (5 + 7), MIII (6 + 0), MIV (6 + 7), MV (1 + 1). Branchiae from chaetigers 10-22, pectinate. Superior chaetae including 2-4 limbate and 2-4 pectinate chaetae; inferior chaetae including 2-4 compound heterogomph falciger and 4-6 heterogomph spiniger chaetae. Subacicular hooks bidentate, starting from chaetiger 21. Acicula light brown.

Remarks. The juveniles of *Marphysa bellii* were described as *Lysibranchia paucibranchiata* by Cantone (1983) (see Çinar, 2005). Among the specimens of *M. bellii* from the Levantine coast of Turkey, we also found some juveniles with only 3 antennae and a reduced number of branchiae.

Ecology. It was found on soft bottoms between 8 and 100 m deep. The maximum density (133 ind.m^{-2}) was found at station G1.

Distribution. Mediterranean Sea, Adriatic, Atlantic Ocean, Pacific Ocean (Fauvel, 1923; George and Hartmann-Schröder, 1985; Salazar-Vallejo and Carrera-Parra, 1998).

***Marphysa fallax* Marion and Bobretzky, 1875**

Marphysa fallax Marion and Bobretzky, 1875: 13-15, pl.1, Figure 1; Fauvel, 1923: 410, Figure 162o-v; Campoy, 1982: 569-572, Figures LXXIh-p; George and Hartmann-Schröder, 1985: 110, Figure 32; Núñez et al., 1997: 63, Figure 10-11.

Material examined. ESFM-POL/2005-1793, D4a, 25 m, 1 specimen; ESFM-POL/2005-1794, D19, 2 specimens.

Diagnosis. Largest specimen incomplete, 10.5 mm long, 0.80 mm wide, with 51 chaetigers. Prostomium shorter (0.3 mm) than peristomium (0.5 mm). Peristomial cirri absent. Maxillary formula: MI (1 + 1), MII (5 + 6), MIII (6 + 0), MIV (4 + 7), MV (1 + 1). Branchiae from chaetigers 15 to 31, with 1 filament. Superior chaetae including 1-4 limbate and 2-4 pectinate chaetae; inferior chaetae including 2-4 compound heterogomph falciger and 2-6 heterogomph spiniger chaetae. Subacicular hooks from chaetiger 19, bidentate. Acicula yellow, tapering, with blunt tip.

Ecology. This species was found on rock and sandy mud biotopes between 25 and 75 m deep.

Distribution. Mediterranean Sea, Indian Ocean, Atlantic Ocean (Fauvel, 1923; George and Hartmann-Schröder, 1985).

***Marphysa sanguinea* (Montagu, 1815)**

Marphysa sanguinea Montagu, 1815: 20-21, pl. 3, Figure 1-3; Fauvel, 1923: 408, Figure 161a-h; Pettibone, 1963: 236, Figure 62; Day, 1967: 396, Figure 17.3a-e; Miura, 1977b: 74-76, Figure 6a-q; Campoy, 1982: 568-569, Figures LXXIa-g; Gathof, 1984: 12, Figure 40-8; George and Hartmann-Schröder, 1985: 112, Figure 33; Salazar-Vallejo and Carrera-Parra, 1998: 1493-1494, Figure 8a-e; Hutchings and Karageorgopoulos, 2003: 88-90, Figures 1; 2a, c; 4a, c.

Material examined. ESFM-POL/2005-1792, DT3, 1 specimen.

Diagnosis. Juvenile specimen, incomplete, 8.1 mm long, 0.80 mm wide, with 20 chaetigers. Prostomium bilobed, dorsally distinct; as longer as first peristomial ring. Peristomial cirri absent. Maxillary formula non-determined. Branchiae from chaetiger 13, with 1 filament. Superior chaetae including 1-4 limbate and 2-4 pectinate chaetae; inferior chaetae including 4-10 heterogomph spiniger chaetae. Compound heterogomph falciger chaetae absent. Subacicular hooks from chaetiger 18, bidentate, dark brown. Acicula dark brown.

Ecology. This species was found on mud bottom at 40 m deep at DT3.

Distribution. Red Sea, Mediterranean Sea, Indian Ocean, Atlantic Ocean, Pacific Ocean (Fauvel, 1923; Day, 1967).

***Nematonereis unicornis* (Grube, 1840)**

Lumbriconereis unicornis Grube, 1840: 80.

Nematonereis unicornis Fauvel, 1923: 412, Figure 162h-n; Day, 1967:403, Figure 17.8g-i; Marinov, 1977: 133; Miura, 1979: 40, Figure 6a-g; Campoy, 1982: 562-564; Salazar-Vallejo and Carrera-Parra, 1998: 1494, Figure 8f-j; Núñez et al., 1997: 71, Figure 15; George and Hartmann-Schröder, 1985: 114, Figure 34.

Material examined. ESFM-POL/2005-1799, K1b, 1 specimen; ESFM-POL/2005-1800, K1a, 3 specimens; ESFM-POL/2005-1801, K6a, 2 specimens; ESFM-POL/2005-1802, K8a, 5 specimens; ESFM-POL/2005-1803, K8c, 1 specimen; ESFM-POL/2005-1804, K9c, 3 specimens; ESFM-POL/2005-1805, K10a, 1 specimen; ESFM-POL/2005-1806, K11a, 3 specimens; ESFM-POL/2005-1807, D4b, 1 specimen; ESFM-POL/2005-1808, D9a, 1 specimen; ESFM-POL/2005-1809, D19, 3 specimens; ESFM-POL/2005-1810, D21, 1 specimen.

Diagnosis. Largest specimen complete, 55.2 mm long, 0.60 mm wide, with 216 chaetigers. Body slender, tapering to posterior end. Prostomium oval to round, with 1 antenna. Branchiae absent. Maxillary formula: MI (1 + 1), MII (4 + 5), MIII (4 + 0), MIV (4 + 6), MV (1 + 1). Superior chaetae including 1-4 limbate and 1-2 pectinate chaetae; inferior chaetae including 2-6 compound heterogomph falciger chaetae. Subacicular hooks from chaetiger 19, dark, bidentate. Acicula dark brown, tapering, distally blunt.

Ecology. This species was found on various biotopes from 0 to 75 m deep. The maximum density (25 individuals.m^{-2}) of it occurred on *Jania rubens* beds at station K1.

Distribution. Mediterranean Sea, Indian Ocean, Atlantic Ocean, Pacific Ocean (Fauvel, 1923; Day, 1967; Salazar-Vallejo and Carrera-Parra, 1998).

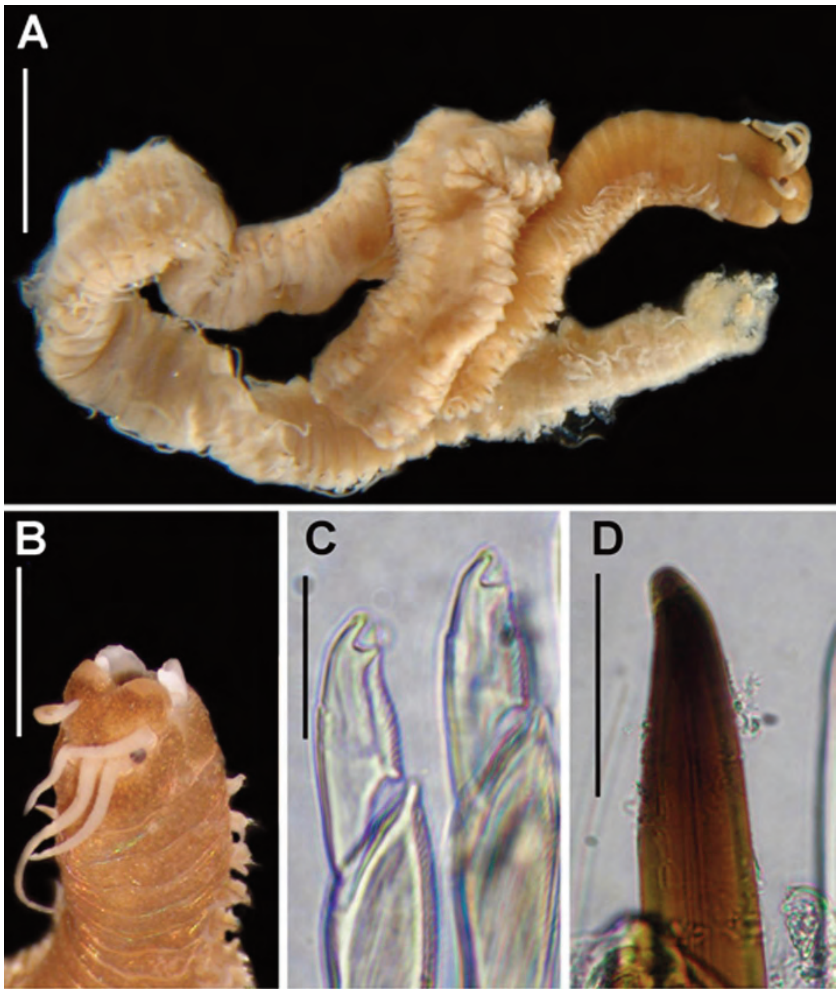

Figure 6. *Palola valida* (ESFM-POL/2005-1783). A. General view of the specimen. B. Anterior end, dorsal view (ESFM-POL/2005-1782). C. Compound falciger chaetae from chaetiger 6. D. Acicula from chaetiger 75. Scale bars: A 3 mm, B 2 mm, C 20 µm, D 75 µm.

***Palola siciliensis* (Grube, 1840)**

Eunice siciliensis Grube, 1840: 83; Gravier, 1900: 261-264, Figures 130-133; Fauvel, 1921: 16-17; Fauvel, 1923: 405, Figure 159e-m; Day, 1967, 382, Figure 17.2a-f; Fishelson and Rullier, 1969: 76-77.

Palola siciliensis Orensanz, 1975: 98, Figure 4; Miura, 1977b: 69-71, Figures 4a-j; Campoy, 1982: 574-576, Figures LXXII; Fauchald, 1992b: 1199, Figure 9j; Núñez et al., 1997: 61, Figure 9; Salazar-Vallejo and Carrera-Parra, 1998: 1494-1495, Figure 8k-n.

Material examined. ESFM-POL/2005-1776, K9c, 1 specimen; ESFM-POL/2005-1777, K9a, 1 specimen; ESFM-POL/2005-1778, K10a, 1 specimen; ESFM-POL/2005-1779, K11a, 2 specimens; ESFM-POL/2005-1844, K8a, 9 specimens.

Diagnosis. Largest specimen incomplete, 69.2 mm long, 2.38 mm wide, with 201 chaetigers. Body anteriorly cylindrical, flattened from chaetiger 30, light pink. Prostomium with 5 antennae. Peristomial cirri smooth, tapering, non-articulated. Maxillary formula MI (1 + 1), MII (3 + 3), MIII (ridge + 0), MIV (2 + 2), MV (1 + 1). Branchiae from chaetiger 180, with 1 filament. Superior chaetae including 2-4 limbate chaetae; inferior chaetae including 8-12 compound heterogomph falciger chaetae. Pectinate,

compound spiniger, pseudocompound falciger chaetae and subacicular hooks absent. Acicula black, tapering, distally blunt; 1 anteriorly; 2 from chaetiger 20.

Ecology. This species was found in crevices of rocks and on harbor pilings between 0.1 and 3 m deep.

Distribution. Mediterranean Sea, Indian Ocean, Atlantic Ocean, Pacific Ocean (Fauvel, 1923; Day, 1967; Salazar-Vallejo and Carrera-Parra, 1998).

***Palola valida* (Gravier, 1900)**

Eunice valida Gravier, 1900: 264-267; Figures 134-136.

Eunice siciliensis Crossland, 1904: 323 (non Grube, 1840)

Palola valida Fauchald, 1992b: 1203-1205, Figure 10

Material examined. ESFM-POL/2005-1780, K8a, 9 specimens; ESFM-POL/2005-1781, K9c, 3 specimens; ESFM-POL/2005-1782, K10a, 24 specimens; ESFM-POL/2005-1783, K11a, 8 specimens; ESFM-POL/2005-1784, K6a, 2 specimens.

Description. Largest specimen incomplete (Figure 6A), 46.9 mm long, 1.59 mm wide, with 128 chaetigers. Body anteriorly cylindrical, flattened from mid-body. Prostomium, peristomium and some anterior chaetigers dark brownish, with scattered mosaic pigmentation (Figure 6B). Prostomium shorter (0.7 mm) than peristomium (1.4 mm). Peristomium with 2 distinct rings, anterior one twice as long as posterior one. Prostomium dorsally flattened; ventrally inflated; median sulcus quite wide. Eyes black, between AI and AII. Antennae increasing in length from AI to AIII; AI located in front of others; AII close to AIII; ceratophore ring shaped, short, non-articulated; ceratostyles digitiform, non-articulated. AI reaching to anterior peristomial ring, AII to chaetiger 1; AIII to middle chaetiger 2. Peristomial cirri tapering, extending to middle of anterior peristomial ring. Maxillary formula: MI (1 + 1), MII (2 + 3), MIII (ridge + 0), MIV (4 + 4), MV (1 + 1). Branchiae from chaetiger 80 to posterior end, with 1 slender filament, longer than dorsal cirri. Anterior parapodial cirri conical, non-articulated; dorsal cirri more tapered than ventral cirri; ventral cirri basally inflated after chaetiger 9-10, digitiform on posterior parapodia, progressively decreasing in size when more posterior. Dorsal cirri sharply tapering on median parapodia. Superior chaetae including 2-6 limbate chaetae and inferior chaetae including 4-8 compound heterogomph falciger chaetae. Limbate chaetae slender, marginally smooth. Compound falciger chaetae bidentate, with shafts inflated, marginally serrated (Figure 6C), anterior ones with proximal tooth, triangular, wider than distal one, blade 31.25 µm long; posterior ones, with distal tooth larger than proximal one, with short shafts. Pectinate, compound spiniger, pseudocompound falciger chaetae and subacicular hooks absent. Acicula dark brown, tapering, distally blunt (Figure 6D); usually 1, rarely 2.

Ecology. This species was found in crevices of rocks and on harbor pilings between 0 and 3 m deep.

Distribution. Red Sea (Gravier, 1900), Turkish Levantine coasts (present paper).

Remarks. Palola valida was originally described from the Red Sea by Gravier (1900) and appears to have been well established in the Levantine Sea. Its morphology resembles that of the native *P. siciliensis*. However, *P. valida* differs in having left MII with 2 teeth, right MII with 3 teeth and MIV with 4 small teeth versus the MII with 3 teeth and MIV with 2 teeth of *P. siciliensis*. The anterior end is also different, being brownish with a scattered whitish mosaic in *P. valida* and light pink, without any mosaic in *P. siciliensis*.

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