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BENTHIC FAUNA OF THE NORTH AEGEAN SEA II. CRINOIDEA AND HOLOTHURIOIDEA (ECHINODERMATA)

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BENTHOS
CRINOÏDES
HOLOTHURIDES
MÉDITERRANÉE
MER ÉGÉE

RÉSUMÉ. – Deux espèces de Crinoïdes et 22 espèces d'Holothurioidea ont été récoltées au Nord de la Mer Égée. 7 espèces, *Holothuria (H.) stellati*, *H. (H.) mammata*, *Paracucumaria hyndmanni*, *Havelockia inermis*, *Phyllophorus granulatus*, *Leptosynapta makrankyra*, *Labidoplax thomsoni* sont nouvelles pour la Méditerranée orientale (20° plus à l'est), 3 espèces, *Holothuria (Thymiosycia) impatiens*, *H. (Platyperona) sanctori*, *H. (Panningothuria) forskali* sont nouvelles pour la Mer Égée, et 5 espèces, le Crinoïde *Leptometra phalangium* et les Holothurides *Holothuria (H.) helleri*, *Leptopentacta tergestina*, *Thyone fusus* et *T. cherbonnieri* sont nouvelles pour le Nord de la Mer Égée. La distribution géographique (et en particulier celle de la Mer Égée), des données écologiques et quelques observations sont indiquées et discutées.

BENTHOS
CRINOIDS
HOLOTHUROIDS
MEDITERRANEAN
AEGEAN

ABSTRACT. – During the sampling that was made in the North Aegean Sea, 2 species of crinoids and 22 species of holothuroids were found. 7 of these species (*Holothuria (H.) stellati*, *H. (H.) mammata*, *Paracucumaria hyndmanni*, *Havelockia inermis*, *Phyllophorus granulatus*, *Leptosynapta makrankyra*, *Labidoplax thomsoni*) are new for the fauna of the eastern Mediterranean (east of 20°), 3 (*Holothuria (Thymiosycia) impatiens*, *H. (Platyperona) sanctori*, *H. (Panningothuria) forskali*) are new for the fauna of the Aegean Sea, and 5 (the crinoid *Leptometra phalangium*, and the holothuroids *Holothuria (H.) helleri*, *Leptopentacta tergestina*, *Thyone fusus* and *T. cherbonnieri*) are new for the fauna of the North Aegean Sea. For the 24 species found, the geographical distribution (mainly in the Aegean) as well as ecological and other information are given and discussed.

INTRODUCTION

Our knowledge on the qualitative composition of the benthic fauna of the North Aegean Sea is very limited. For this reason, a research on this subject has begun since 1970. This paper, which is the second of the series, includes the information that was obtained on crinoids and holothuroids.

The review of the literature showed that the little existing information is given by Tortonese & Demir (1960), Makkavieva (1963), Geldiay & Kocatas (1972) and Ünsal (1973). Little is also the information for the South Aegean Sea and the west coasts of Greece (Ionian Sea) given by Forbes (1843), Steindahner (1891), Marenzeller (1893), Panagiotopoulos (1916), Politis (1928), Bel-

loc (1948), Pérès & Picard (1958), Vamvakas (1970, 1971) and Salvini-Plawen (1977) correspondingly.

The few existing information about the environmental conditions in the North Aegean Sea are given by Spratt (1848), Golemis (1936), Lacombe *et al.* (1958, 1960), Blanc (1964), Miller & Stanley (1965), Pérès (1967), Stanley (1969), Bacescu *et al.*, (1971) and Koukouras (1979).

MATERIALS AND METHODS

The 1512 specimens that were examined, were collected from 120 sampling stations in the North Aegean

Sea (see map). Several samples were taken in every one station. The sampling was carried out by otter trawl (in this case the sampling stations are marked with capital letters), by free or SCUBA diving, by various types of dredge and a van Veen sampler. Because of technical difficulties the sampling was carried out, with only a few exceptions, down to a depth of 200 m, but intensively only down to 100 m. However, we believe that sampling will be soon carried out in greater depths, so that the whole North Aegean Sea will be covered.

THE SAMPLING STATIONS

In the following tables, information is given for the sampling stations where crinoids and holothuroids were found. In the column of the "gear used" the free diving is marked with FD, the SCUBA diving with SD, the use of an otter trawl with OT, the use of dredge with D and the use of grab with G.

TABLEAU I

St.	Locality	Depth m	Substratum	Gear used
A	North of Samothraki	20-90	sand silt, silt	OT
B	NE, E, SE of Thassos	45-160	silt sand, silt	OT
C	Gulf of Kavala	36-90	silt sand, silt	OT, D, G
D	SW of Kavala	40-120	silt sand, silt	OT, D, G
E	Strymonikos Gulf	25-105	silt sand, silt	OT, D, G
F	SW of Thassos	90-460	silt	OT
G	Singitikos Gulf	140-350	silt	OT
H	Toroneos Gulf	140-270	silt	OT
I	Gulf of Thessaloniki	25-36	sand silt, silt	OT, D, G
J	Thermaikos Gulf	35-70	silt sand, silt	OT, D
K	Thermaikos Gulf	60-145	silt sand, silt	OT, D
L	Diavlos Trikeri	45-105	maërl, silt sand, silt	OT, D
M	SW of Skiathos	70-190	maërl, silt sand, silt	OT, D
O	NE, E, S of Alonnisos	80-450	silt	OT
P	W, SW, S of Limnos	90-210	silt	OT
Q	SW, S of Lesvos	90-250	silt	OT
R	West of Chios	85-480	silt	OT
S	SE of Chios	15-230	sand, silt sand, silt	OT
U	NE of Magnisia	80-280	silt	OT
V	Thermaikos Gulf	30-85	silt sand, silt	OT, D, G
W	Pagositikos Gulf	25-95	silt sand, silt	OT, D

RESULTS

1. CRINOIDEA

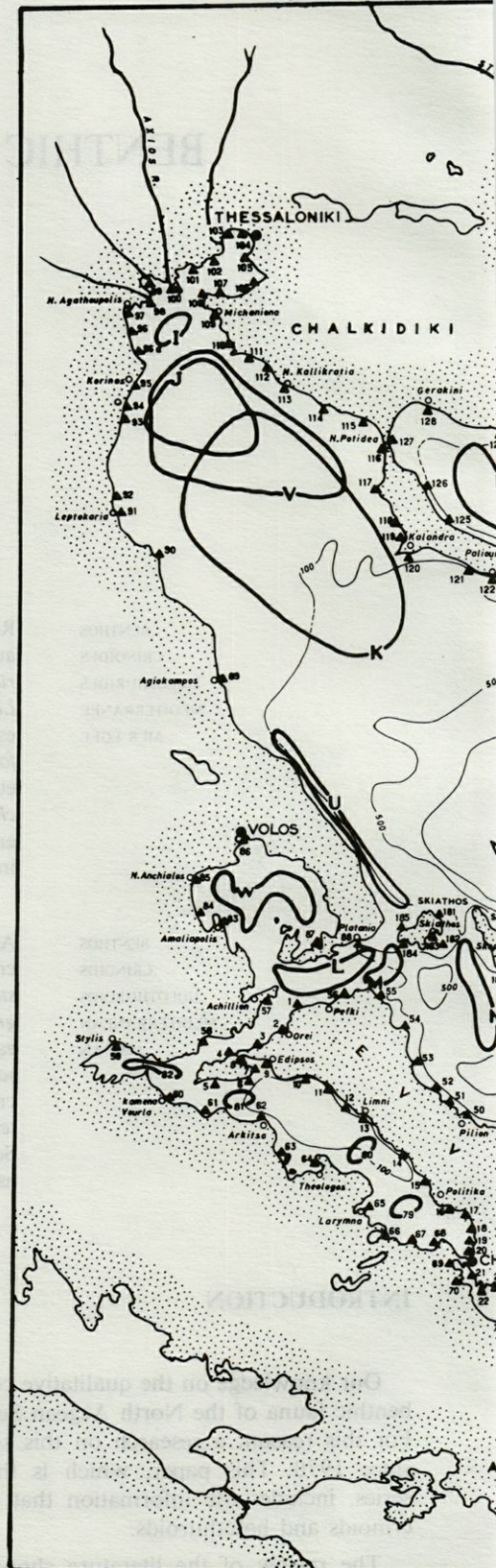
Antedonidae

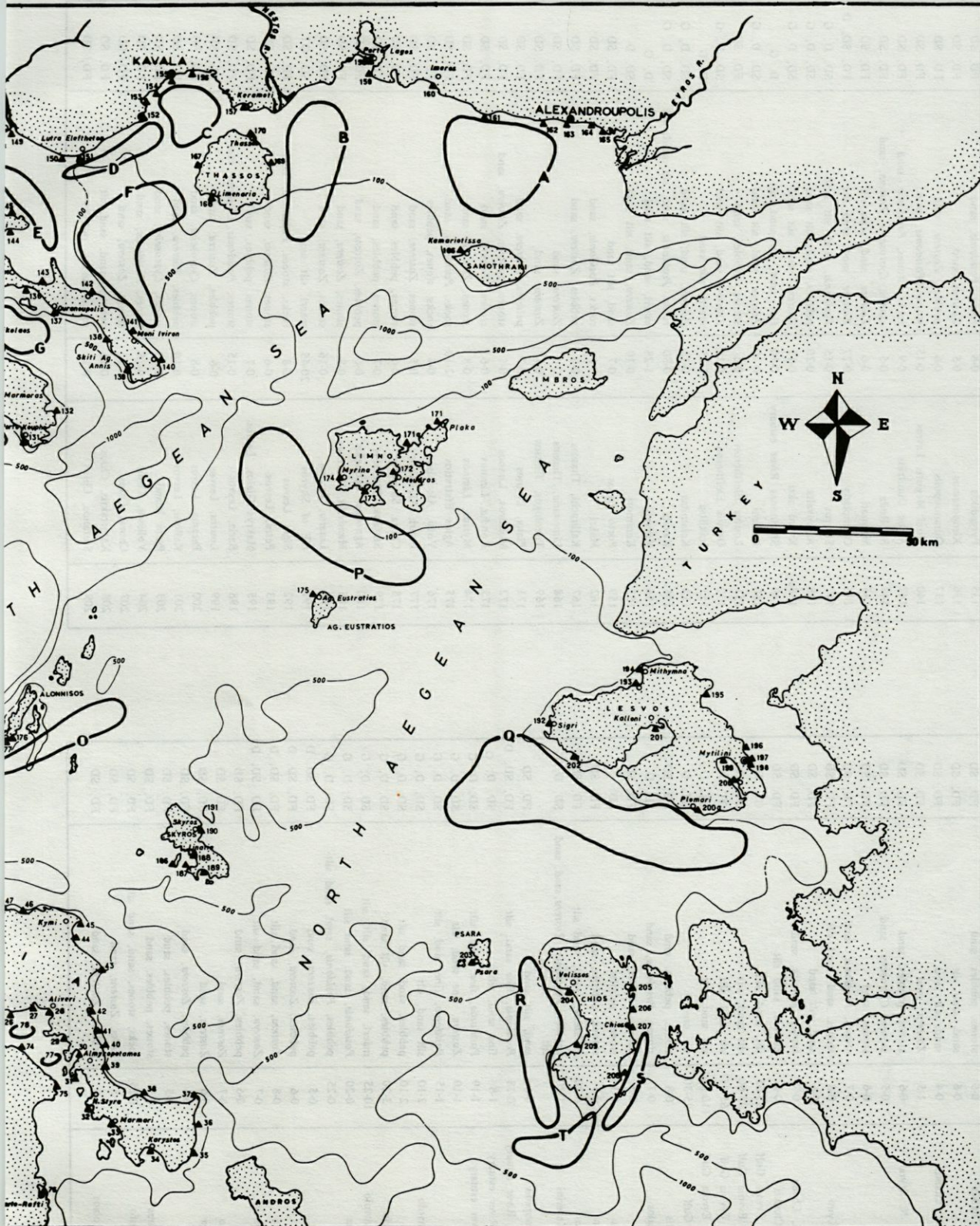
Antedon mediterranea (Lamarck, 1816).

Antedon mediterranea, Koehler, 1921, p. 195, fig. 149 b, 150; 1927, p. 123, pl. 11 fig. 7. — Tortonese, 1952, p. 168, fig. 2; 1965, p. 29, fig. 6 A-C, 7, 8.

Antedon adriatica, Kolosvary, 1938, p. 47, fig. 1-3.

Material: 524 specimens, stations 80, 198, A, C, D, E, I, J, K, L, R, S, V, W. Max. number of cirri 49;





Map showing location of sampled areas, in the North Aegean Sea.

Carte de prélèvements, au Nord de la mer Égée.

TABLEAU II

Station number	Locality	Depth m	Substratum	Gear used
19	Manika, Chalkis	0-5	stones, pebbles, sand	FD, SD
20	Chalkis	0-6	sand, sand silt	FD, SD
21	Lampsakos, Chalkis	0-4	sand, silt sand	FD, SD
25	Eretria	1-5	<i>Zostera</i> , sand	FD, SD
31	Paliobori, N. Styra	0-6	stones, pebbles, sand	FD, SD
34	Karystos	0-5	stones, <i>Cystoseira</i> , sand	FD, SD
39	Tsakei	0-6	stones, sand	FD, SD
42	Petries	0-7	stones, <i>Posidonia</i> , sand	FD, SD
45	Sutsini, Kymi	0-8	stones, sand, sand silt	FD, SD
65	Larymna	0-6	sand, silt sand	FD, SD
68	Eglezonisi, Chalia	0-7	stones, pebbles, sand	FD, SD
69	Glypha, Chalkis	0-6	<i>Zostera</i> , sand silt	FD, SD
77	Southern Evvoia Gulf	55-65	silt sand, silt	OT, D
78	Southern Evvoia Gulf	35-60	silt sand, silt	OT, D
79	Northern Evvoia Gulf	65-85	silt sand, silt	OT, D
80	Northern Evvoia Gulf	110-120	silt sand, silt	OT, D
82	Maliakos Gulf	25-30	silt sand	OT, D
83	Amaliapolis	0-8	stones, pebbles, sand	FD, SD
85	N. Anchiolos	0-7	stones, <i>Posidonia</i> , sand	SD, D
87	Trikeri	0-8	stones, pebbles, sand	FD, SD
91	Leptokaria	0-3	stones, pebbles	FD
92	Litochoron	0-5	stones, pebbles, sand	FD, SD
96	Makrygiolos	0-20	<i>Posidonia</i> , sand, sand silt	FD, SD
96a	Alykes, Katerini	1-20	pebbles, <i>Posidonia</i> , <i>Zostera</i> , sand, sand silt	SD, D, G
97	N. Agathoupolis	0-6	sand, silt sand	FD, SD
98	Aliakmon River estuary	0-18	<i>Posidonia</i> , fine sand, silt	FD, SD, D
99	Loudias River estuary	1-8	fine sand, silt	SD, D, G
100	Axios River estuary	1-19	<i>Posidonia</i> , fine sand, silt	SD, D, G
101	Lefkoudi	1-10	<i>Zostera</i> , fine sand, silt	SD, D, G
102	Paliomana	1-15	<i>Posidonia</i> , fine sand, silt	SD, D, G
105	Mikro Emvolo	2-10	silt sand, silt	SD, D, G
106	Trimini	2-10	pebbles, sand, sand silt	SD, D, G
107	Agia Triada	3-20	pebbles, sand, silt sand	SD, D, G
108	Megalo Emvolo	10-25	märl, sand, sand silt, silt	SD, D, G
109	Michaniona	0-20	<i>Posidonia</i> , sand, sand silt	SD, D, G
110	Epanomi	0-25	pebbles, <i>Posidonia</i> , sand, sand silt	SD, D, G
112	N. Iraklia	0-5	pebbles, <i>Zostera</i> , sand	FD, SD, D
114	N. Plagia	0-6	pebbles, <i>Zostera</i> , sand	FD, SD, D
116	N. Potidea	0-8	<i>Zostera</i> , sand, sand silt	FD, SD, D
117	Ak. Pigos	0-7	<i>Zostera</i> , sand, sand silt	FD, SD, D
120	Kalandra	0-6	pebbles, <i>Zostera</i> , sand	FD, SD
125	Polychrono	0-7	<i>Zostera</i> , sand	FD, SD
127	N. Potidea	0-6	<i>Zostera</i> , sand	FD, SD
128	Gerakini	0-6	pebbles, <i>Zostera</i> , sand	FD, SD
129	Nikiti	0-5	stones, pebbles, sand	FD, SD
130	N. Marmaras	0-3	stones, pebbles, sand	FD, SD
131	Porto Koufo	0-25	rocks, stones, sand, sand silt	FD, SD
132	Sykia	0-5	rocks, <i>Zostera</i> , sand	FD, SD
134	Agios Nikolaos	0-6	pebbles, <i>Zostera</i> , sand	FD, SD

Station number	Locality	Depth m	Substratum	Gear used
135	Pyrgadikia	0-8	rocks, <i>Posidonia</i> , sand	FD, SD
136	Xiropotamos	0-5	<i>Zostera</i> , sand	FD, SD
137	Ouranoupolis	0-6	pebbles, <i>Zostera</i> , sand	FD, SD
140	Moni Megistis Lavras	0-15	stones, <i>Posidonia</i> , sand	FD, SD
142	Agios Dimitrios	0-9	rocks, stones, <i>Posidonia</i> , sand	FD, SD
143	N. Roda	0-5	stones, <i>Cystoseira</i> , <i>Zostera</i> , sand	FD, SD
145	Marmari	0-6	<i>Zostera</i> , sand, sand silt	FD, SD
146	Olympiada	0-27	<i>Zostera</i> , sand, sand silt	FD, SD, D
147	Stavros	0-15	<i>Posidonia</i> , sand, silt sand	SD, D, G
148	Asprovalta	0-20	pebbles, sand, silt sand	SD, D, G
148a	Kyani akti	0-15	<i>Zostera</i> , sand, silt sand	SD, D, G
149	Strymonas River estuary	0-10	fine sand, silt sand, silt	D, G
150	Kariani	0-10	<i>Zostera</i> , sand, silt sand	SD, D, G
151	Loutra Eleftheron	0-6	stones, pebbles, sand	FD, SD
152	Ormos Eleftheron	0-15	<i>Zostera</i> , sand, silt sand	SD, D, G
153	Iraklitsa	15-35	märl, silt sand	D, G
154	Kalamitsa	0-15	<i>Zostera</i> , sand, silt sand	SD, D, G
155	Kavala	0-30	rocks, <i>Posidonia</i> , sand, silt sand, silt	SD, D, G
156	Karvali	1-28	märl, sand, silt sand	D, G
157	Keramoti	0-10	<i>Zostera</i> , sand, silt sand	SD, D
159	Porto Lagos	0-7	sand, silt sand	FD, SD
162	Makri	0-6	rocks, <i>Posidonia</i> , sand	FD, SD
167	Kallirachi, Thassos	0-8	pebbles, <i>Zostera</i> , sand	FD, SD
168	Limenaria, Thassos	0-6	<i>Zostera</i> , sand	FD, SD
169	Theologos, Thassos	0-7	<i>Zostera</i> , sand	FD, SD
171	Plaka, Limnos	0-7	pebbles, <i>Zostera</i> , sand	FD, SD
172	Moudros, Limnos	0-5	stones, pebbles, <i>Zostera</i> , sand	FD, SD
173	Kondia, Limnos	0-6	stones, <i>Zostera</i> , sand	FD, SD
174	Myrina, Limnos	0-8	stones, <i>Zostera</i> , sand	FD, SD
175	Agios Efstratios	2-10	rocks, <i>Posidonia</i> , sand	FD, SD
176	Votsi, Alonnisos	0-4	rocks, stones, pebbles	FD, SD
177	Patiri, Alonnisos	0-5	stones, <i>Zostera</i> , sand	FD, SD
178	Chora, Skopelos	0-6	stones, pebbles, sand	FD, SD
179	Stafilos, Skopelos	0-7	stones, pebbles, sand	FD, SD
180	Agnodas, Skopelos	0-6	pebbles, <i>Zostera</i> , sand	FD, SD
185	Mandraki, Skiathos	0-8	stones, <i>Zostera</i> , sand	FD, SD
188	Linaria, Skyros	0-16	stones, <i>Zostera</i> , sand	FD, SD
191	NE of Skyros	20-45	märl, silt sand	SD, OT
192	Sigri, Lesvos	0-8	rocks, stones, <i>Posidonia</i> , sand	FD, SD
193	Petra, Lesvos	0-6	stones, <i>Zostera</i> , sand	FD, SD
195	Makrys Gialos, Lesvos	0-7	stones, pebbles, sand	FD, SD
198	Baria, Lesvos	0-15	stones, <i>Posidonia</i> , <i>Zostera</i> , sand	FD, SD
199	Loutra, Lesvos	0-6	pebbles, <i>Zostera</i> , sand	FD, SD
200	Perama, Lesvos	0-8	stones, <i>Cystoseira</i> , sand	FD, SD
201	Kalloni, Lesvos	0-10	pebbles, <i>Zostera</i> , sand	FD, SD
203	Psara Island	0-15	stones, <i>Cystoseira</i> , sand	FD, SD
204	Volissos, Chios	0-15	stones, <i>Posidonia</i> , sand	FD, SD
207	Chora, Chios	0-8	stones, <i>Zostera</i> , sand	FD, SD
208	Katarraktis, Chios	0-22	pebbles, sand, sand silt	FD, SD
209	Stefanos, Chios	0-12	rocks, stones, pebbles	FD, SD

Lmax. of cirri 26 mm. Max. number of segments in a cirri 32; min. 10. Lmax. of branches 168 mm.

Ecology: depths from 10 m to 230 m (infralittoral and circalittoral zones), in *Zostera* or *Posidonia* meadows and on maërl or detritic substrates. 6 individuals of the parasite *Myzostomum glabrum* were found on a specimen.

Distribution: many localities of the Aegean Sea (Forbes 1843, as *Comatula rosacea*; Tortonese 1946, 1947, 1965; Belloc 1948; Peres & Picard 1958; Tortonese & Demir 1960; Kisseleva 1961, 1963; Jacquotte 1962; Vamvakas 1971; Ünsal 1973).

Leptometra phalangium (J. Müller, 1941)

Leptometra phalangium, Koehler, 1921, p. 197, fig. 151-153 a; 1927, p. 131, pl. 9, fig. 4-6. — Tortonese, 1965, p. 33, fig. 6 D, 9.

Material: 32 specimens, stations G, M, O, R, U. Lmax. of cirri 70 mm. Max. number of segments in a cirri 50; min. 23. Other measurements were not permitted because the specimens had been damaged in part, during the sampling.

Ecology: We found it on silt substrates, in depths between 180 m and 300 m (circalittoral and bathyal zones). It has been found, however, by «Pola» in the South Aegean Sea, between 660 m and 1292 m (Steindachner 1891). According to Picard (1965), it is exclusive characteristic species of the biocoenosis of the shelf-edge detritic (DL).

Distribution: This is the first time it is mentioned in the North Aegean Sea. In the South Aegean Sea its occurrence has been mentioned by Steindachner (1891), Marenzeller (1893), Belloc (1948) and Kisseleva (1963).

2. HOLOTHURIOIDEA

Holothuriidae

Holothuria (Holothuria) tubulosa Gmelin, 1788

Holothuria tubulosa, Koehler, 1927, p. 215, pl. 16, fig. 25. — Tortonese, 1965, p. 53, fig. 16-17.

Holothuria (Holothuria) tubulosa, Rowe, 1969, p. 152, fig. 17.

Material: 105 specimens from the stations 20, 39, 77, 79, 82, 83, 85, 87, 92, 105, 108, 109, 110, 112, 127, 128, 130, 131, 134, 143, 146, 151, 152, 157, 159, 162, 174, 178, 179, 185, 199, 200, I, V. Lmax. 213 mm.

Ecology: It was found in *Zostera* or *Posidonia* meadows, on sand, silty sand and stones, in depths from 0.3 m to 83 m (infralittoral and circalittoral zones), but usually down to 10 m. According to Peres & Picard (1964) and Peres (1967) it is component species of the biocoenosis SVMC.

Distribution: in the North Aegean Sea it is known from the Turkish coasts (Geldiay & Kocatas 1972, Ünsal 1973). In the South Aegean Sea its occurrence has been mentioned by Panagiotopoulos (1916) and (Pères & Picard 1958).

Holothuria (Holothuria) stellati Delle Chiaje, 1823

Holothuria stellati, Koehler, 1921, p. 176, fig. 131; 1927, p. 219, pl. 16, fig. 27.

Holothuria (Holothuria) stellati, Rowe, 1969, p. 153.

Material: One specimen, 129 mm long. Station W.

Ecology: depth of 30 m (infralittoral zone) on a silt sandy substratum. According to Cherbonnier (1958) it can be found in other types of substrata, too.

Distribution: This species is known from the western Mediterranean and the Adriatic Sea (Carus 1885, Koehler 1927, Cherbonnier 1958, Tortonese 1965, Fredj 1974); so far, it had not been reported from the eastern Mediterranean.

Holothuria (Holothuria) mammata Grube, 1840

Holothuria mammata, Koehler, 1921, p. 177, fig. 132, 133; 1927, p. 220, pl. 16 fig. 22. — Cherbonnier, 1960, p. 118, fig. 1. — Tortonese, 1965, p. 57, fig. 18.

Holothuria (Holothuria) mammata, Rowe, 1969, p. 153.

Material: 33 specimens, stations 31, 91, 114, 130, 131, 135, 137, 145, 146, 153, 168, 169, 171, 172, 173, 179, 203, 207, 209, L. Lmax. 200 mm.

Ecology: We found it in depths between 1 m and 26 m (infralittoral zone), on substrata consisted of smaller or greater stones and more or less sand some times mixed with some silt.

Distribution: This species is also reported for the first time from the eastern Mediterranean. In the central and western Mediterranean it is known from the gulf of Naples and Nice (Carus 1885), from the coasts of Algeria (Tortonese 1956) and from Banyuls (Cherbonnier 1960, Cherbonnier & Guille 1967).

Holothuria (Holothuria) helleri Marenzeller, 1878

Holothuria helleri, Koehler, 1921, p. 180, fig. 136; 1927, p. 234, pl. 16 fig. 23. — Tortonese, 1935, p. 317, fig. 1-2; 1965, p. 63, fig. 23.

Holothuria (Holothuria) helleri, Rowe, 1969, p. 153.

Material: 9 specimens, stations 129, 140, 142, 168, 172, 180, 192, 203. Lmax. 48 mm.

Ecology: on sand or among the rhizomes of *Posidonia* and also among various algae, and in depths from 1 m to 6 m (upper infralittoral zone). It is also a rather rare species for the North Aegean Sea.

Distribution: It is mentioned for the first time from the North Aegean Sea. The only record of this species for the eastern Mediterranean, up to now, was from NW Saronikos Gulf (Vamvakas, 1971).

Holothuria (Lessonothuria) polii Delle Chiaje, 1832

Holothuria polii, Koehler, 1921, p. 178, fig. 134; 1927, p. 222, pl. 16 fig. 32. — Mayer, 1937, p. 18, fig. 7-8. — Tortonese, 1965, p. 58, fig. 29-20.

Holothuria (Lessonothuria) polii, Rowe, 1969, p. 149.

Material: 100 specimens, stations 21, 25, 42, 78, 83,

87, 105, 108, 109, 110, 112, 116, 117, 125, 128, 129, 130, 132, 134, 136, 143, 145, 146, 151, 152, 153, 159, 167, 169, 173, 174, 177, 178, 179, 185, 188, 192, 193, 195, 198, 199, 201, 204, 207, C. Lmax. 151 mm.

Ecology : depths between 0.5 m and 40 m (infralittoral zone), on stones, pebbles, sand, silty sand, *Posidonia* or *Zostera* meadows and among algae. The most common species in the coastal waters of the North Aegean Sea. According to Pérès & Picard (1964) and Pérès (1967) it is one of the component species of the biocoenosis SVMC.

Distribution : In the North Aegean Sea it is known from the Turkish coasts (Geldiay & Kocatas 1972, Ünsal 1973). It is also known from the South Aegean Sea (Politis 1928, Pérès & Picard 1958).

Holothuria (Thymiosycia) impatiens (Forsk., 1775)

Holothuria impatiens, Koehler, 1921, p. 173, fig. 129; 1927, p. 214, pl. 16, fig. 19. – Mayer, 1937, p. 14, fig. 4.

Holothuria (Thymiosycia) impatiens, Rowe, 1969, p. 145, fig. 13. – Clark & Rowe, 1971, p. 173, fig. 85 a, a', pl. 26, fig. 2, pl. 28, fig. 8.

Material : 26 specimens, stations 19, 20, 31, 68, 69, 83, 105, 110, 112, 134, 173, 200, 209. Lmax. 92 mm.

Ecology : In depths between 1 and 8 m (upper infralittoral zone), on substrata consisted of smaller or greater stones, or sand, but usually in *Zostera* or *Posidonia* meadows or among algae.

Distribution : This species was known up to now in the eastern Mediterranean only from the coasts of Israel (Tortonese, 1956). In the western and central Mediterranean it is known from various regions (Tortonese 1961, Bruno 1972, etc.).

Holothuria (Platyperona) sanctori Delle Chiaje, 1823

Holothuria sanctori, Koehler, 1921, p. 171, fig. 127; 1927, p. 207, pl. 16, fig. 21. – Tortonese, 1965, p. 61, fig. 21 A, 22.

Holothuria (Platyperona) sanctori, Rowe, 1969, p. 145.

Material : 11 specimens, stations 34, 120, 130, 132, 134, 174, 176, 188; Lmax. 131 mm.

Ecology : In depth of 2 to 15 m (infralittoral zone) on substrata of stones and sand or among algae, but usually in crevices or under rocks. Rather rare species for the North Aegean Sea.

Distribution : It is reported for the first time from the Aegean Sea. In the eastern Mediterranean it is known from the coasts of Egypt and Lebanon (Tortonese, 1966). It is also known from other regions in the Mediterranean (Tortonese 1965, Sibuet 1974, etc.).

Holothuria (Panningothuria) forskali Delle Chiaje, 1823.

Holothuria forskali, Koehler, 1921, p. 179, fig. 135; 1927, p. 226, pl. 16, fig. 20. – Mayer, 1937, p. 20, fig. 10-11. – Tortonese, 1965, p. 64, fig. 23 B.

Holothuria (Panningothuria) forskali, Rowe, 1969, p. 141, fig. 10.

Material : 26 specimens, stations 79, 153, 157, 169, 171, 172, 173, 175, 191, Lmax. 112 mm.

Ecology : depths between 1 and 80 m (infralittoral and circalittoral zones), on substrata of silt and silty sand, in *Posidonia* or *Zostera* meadows and among algae. According to Pérès & Picard (1964) it is one of the component species of the biocoenosis RL.

Distribution : This is the first record of this species from the Aegean Sea. In the eastern Mediterranean it was known up to now only from the coasts of Israel (Tortonese 1965). In the rest Mediterranean it is known from various regions (Mayer 1937, Cherbonnier & Guille 1967, Zavodnik 1968, etc.).

Stichopodidae

Stichopus regalis (Cuvier, 1817).

Stichopus regalis, Koehler, 1921, p. 182, fig. 138; 1927, p. 237, pl. 16, fig. 24. – Mayer, 1937, p. 22, fig. 12-13. – Tortonese, 1952, p. 227, fig. 8; 1965, p. 66, fig. 24-25.

Material : 40 specimens, stations 45, A, B, C, E, F, G, H, I, L, P, R, V, W. Lmax. 207 mm.

Ecology : In depths from 6 to 200 m (Infralittoral and circalittoral zones) on silty and sand silty substrata. In the South Aegean Sea, however, it was found by « Pola » in a depth of 834 m (Steindachner 1891). According to Pérès & Picard (1964) it is component species of the biocoenoses VTC and VP.

Distribution : Known from several regions of the Aegean Sea (Steindachner, 1891, Tortonese & Demir, 1960, Vamvakas, 1971, Ünsal, 1973).

Cucumariidae

Stereoderma kirschbergi (Heller, 1868)

Cucumaria kirschbergi, Koehler, 1921, p. 156, fig. 108; 1927, p. 173, pl. 16, fig. 7. – Mayer, 1937, p. 24, fig. 16-17. – Tortonese, 1965, p. 78, fig. 30.

Stereoderma kirschbergi, Panning, 1949, p. 422.

Material : One specimen 11 mm long from the station 153.

Ecology : In depth of 30 m (infralittoral zone) on a maërl substratum. Component species of the biocoenosis DC (Pérès & Picard 1964).

Distribution : In the eastern basin of the Mediterranean it was known only from SW Saronikos Gulf (Vamvakas, 1971) and from the Turkish Aegean coasts (Ünsal, 1973). However, it has been reported from the Sea of Marmara, Bosphorus and Black Sea (Tortonese 1965, Caspers 1968, Bacescu *et al.* 1971).

Ocnus planci (Brandt, 1835)

Cucumaria planci, Koehler, 1921, p. 153, fig. 101-104; 1927, p. 164, pl. 16, fig. 3. – Mayer, 1937, p. 23,

- fig. 14-15. — Tortonese, 1952, p. 229, fig. 32-33; 1965, p. 81. — Cherbonnier, 1956, p. 20.
- Ludwigia planci*, Panning, 1949, p. 433, fig. 26. — Cherbonnier, 1958, p. 60.
- Pentacucumis planci*, Deichman, 1957, p. 13, fig. 54-71.
- Ocnus planci*; Rowe, 1970, p. 686. — Panning, 1971, p. 30, fig. 1-2, pl. 3.
- Material: 98 specimens, stations 42, 78, 79, 85, 105, 108, E, I, L, V, W. Lmax. 110 mm
- Ecology: In depths between 6 and 90 m (infralittoral and circalittoral zones), on silty and sand silty substrata, as well as in *Posidonia* meadows.
- Distribution: The first time it was found in the Aegean Sea is the one by Tortonese & Demir (1960). Its presence in the Aegean Sea and the Black Sea has been reported later by Bacescu *et al.* (1971), Geldiay & Kocatas (1972) and Ünsal (1973).
- Paracucumaria hyndmanni* (Thompson, 1840)
- Cucumaria hyndmanni*, Koehler, 1921, p. 157, fig. 109; 1927, p. 174, pl. 16, fig. 8. — Tortonese, 1965, p. 74.
- Paracucumaria hyndmanni*, Panning, 1949, p. 419. — Cherbonnier, 1958, p. 58.
- Material: 4 specimens, stations 106, 107, 110. Lmax. 18 mm.
- Ecology: depths between 7 and 25 m (infralittoral zone), on substrata consisted of coarse sand mixed with a great enough quantity of pebbles as well as with many shells of molluscs. According to Fredj (1974), its bathymetrical distribution ranges between 50 and 150 m. At the station 106 the salinity was 33.2‰.
- Distribution: Although this species is known from the central and western basin of the Mediterranean, this is its first report from the eastern basin. Also known (as *Skleroderma hyndmanni*) from the Black Sea (Caspers 1968).
- Leptopentacta tergestina* (M. Sars, 1857)
- Cucumaria tergestina*, Koehler, 1921, p. 158, fig. 110-111; 1927, p. 175, pl. 16, fig. 9. — Mayer, 1937, p. 26, fig. 18-19. — Tortonese, 1952, p. 231, pl. 1, fig. 10.
- Trachythyone tergestina*, Panning, 1949, p. 426. — Tortonese, 1965, p. 83, fig. 34-35 A.
- Leptopentacta tergestina*, Panning, 1966, p. 66.
- Material: 10 specimens, stations 96a, 153 E, L, V, W. Lmax. 76 mm.
- Ecology: In depths between 8 and 70 m (infralittoral and circalittoral zones) on silty and sand silty substrata. According to Pérès & Picard (1964) it is one of the component species of the biocoenosis VTC.
- Distribution: Known in the eastern Mediterranean, up to now, from the NW Saronikos Gulf (Vamvakas 1970, 1971), from the Turkish Aegean coasts (Ünsal 1973) and from the Sea of Marmara (Tortonese & Demir, 1960).
- Leptopentacta elongata* (Düben & Koren, 1844)
- Cucumaria elongata*, Koehler, 1921, p. 160, fig. 112-113; 1927, p. 177, pl. 16, fig. 10. — Mayer, 1937, p. 28, fig. 20-21.
- Trachythyone elongata*, Panning, 1949, p. 429, fig. 18. — Cherbonnier, 1958, p. 60. — Tortonese, 1965, p. 85, fig. 35 B-36.
- Leptopentacta elongata*, Panning, 1966, p. 62, fig. 7.
- Material: 133 specimens, stations 96, 96a, 97, 98, 99, 100, 101, 102, 105, 106, 107, 108, 145, 146, 147, 150, 154, 156, 157, C, E, I, J, V. Lmax. 81 mm.
- Ecology: depths from 2 to 100 m (infralittoral and circalittoral zones), on various types of substrata (silt, sand silt, pebbles, *Zostera* or *Posidonia* meadows). It is also considered component species of the biocoenosis VTC (Peres & Picard, 1964).
- Distribution: Mentioned in several regions of the Aegean Sea (Forbes 1843 as *Cucumaria pentactes*, Pérès & Picard 1958, Ünsal 1973).
- Thyone fusus* (O.F. Müller, 1788)
- Thyone fusus*, Koehler, 1921, p. 164, fig. 118; 1927, p. 190, pl. 16 fig. 13 (*partim*). — Tortonese, 1935, p. 322, fig. 3; 1965, p. 88, fig. 37A. — Mayer, 1937, p. 30, fig. 23-24.
- Thyone fusus mediterranea*, Madsen, 1941, p. 17, fig. 12-16. — Tortonese, 1952, p. 233.
- Material: 7 specimens, stations 131, 146, J, L. Lmax. 18 mm.
- Ecology: depths between 20 and 60 m (infralittoral and circalittoral zones) on a sand silty substratum.
- Distribution: This is the first report of this species from the North Aegean Sea. Its only previous report for the eastern Mediterranean is the one by Vamvakas (1971) from the NW Saronikos Gulf.
- Thyone cherbonnieri* Reys, 1959
- Thyone cherbonnieri* Reys, 1959, p. 173, fig. 1-6. — Tortonese, 1965, p. 88.
- Material: 19 specimens, stations 96, 96a, 97, 106, 107, 108, 110, 147, 156, C, I, J. Lmax. 47 mm.
- Ecology: In depths from 3 to 44 m (infralittoral zone) on substrata of silt, sand silt, pebbles, or in *Zostera* and *Posidonia* meadows.
- Distribution: New for the fauna of the North Aegean Sea. In the eastern Mediterranean it was known, up to now, only from Saronikos Gulf (Vamvakas, 1970, 1971). In the rest Mediterranean it is known only from the French and Spanish coasts (Reys 1960; Cherbonnier & Guille 1967; Guille 1970, 1976).
- Havelockia inermis* (Heller, 1868)
- Thyone inermis*, Koehler, 1921, p. 167, fig. 123; 1927, p. 193, pl. 16, fig. 15. — Mayer, 1937, p. 32, fig. 27.
- Havelockia inermis*, Cherbonnier, 1958, p. 62. — Tortonese, 1965, p. 90, fig. 37B.

Material : 4 specimens, stations 208, H, Q. Lmax. 12 mm.

Ecology : depths between 20 and 200 m (infralittoral and circalittoral zones) on silty or sand silty substrata.

Distribution : reported here for the first time from the eastern Mediterranean. In the rest Mediterranean it has been reported from the Adriatic, Ionian, west coasts of Italy and Banyuls (Carus 1885, Marenzeller 1893, Mayer 1937, Cherbonnier 1958).

Phyllophoridae

Phyllophorus urna Grube, 1840

Phyllophorus urna, Koehler, 1921, p. 169, fig. 126; 1927, p. 198, pl. 16 fig. 18. – Mayer, 1937, p. 34, fig. 28-29. – Tortonese, 1965, p. 93, fig. 39-40.

Material : 4 specimens, stations 96a, 207, E. Lmax. 37 mm.

Ecology : In depths between 2 and 90 m (infralittoral and circalittoral zones), on silty or sand silty substrata, or in *Posidonia* and *Zostera* meadows.

Distribution : The only reports of this species known to us from the eastern Mediterranean are from the NW Saronikos Gulf (Vamvakas 1971) and from the gulf of Smyrna (Geldiay & Kocatas 1972).

Phyllophorus granulatus (Grube, 1840)

Phyllophorus granulatus, Koehler, 1927, p. 199, pl. 14, fig. 14. – Cherbonnier & Guille, 1972, p. 281, fig. A-N.

Material : One specimen 30 mm long, station 96a.

Ecology : depth of 3 m (upper infralittoral zone) in a *Zostera* meadow.

Distribution : This is the first report of the species from the eastern Mediterranean. In the rest Mediterranean it is known from the coasts of Sicily and Naples (Carus, 1885), the coasts of Tunisia (Cherbonnier 1956) and the gulf of Rosas (Cherbonnier & Guille 1972).

Synaptidae

Leptosynapta makrankyra (Ludwing, 1898)

Leptosynapta makrankyra, Koehler, 1921, p. 187. – Tortonese, 1965, p. 105. – Cherbonnier, 1968, p. 1214, fig. a-k.

Material : 3 specimens, stations 96a, 152, I. Lmax. 12 mm.

Ecology : depths of 3 m, 8 m and 36 m (infralittoral zone), on sand silty bottom and in *Zostera* meadows.

Distribution : reported here for the first time from the eastern basin of the Mediterranean. In the rest Mediterranean, known from the Italian coasts (Clark 1907) and the French coasts (Guille 1970).

Labidoplax digitata (Montagu, 1815)

Labidoplax digitata, Clark, 1907, p. 95. – Koehler, 1921, p. 188, fig. 143-144; 1927, p. 274, pl. 16,

fig. 30. – Heding, 1931, p. 672, fig. 11 (1-12). – Tortonese, 1935, p. 263; 1965, p. 106, fig. 46.

Oestergrenia digitata, Tortonese, 1959, p. 290.

Material : 319 specimens, stations 96a, 98, 100, 105, 107, 108, 109, 110, 145, 146, 147, 148, 148a, 149, 150, 152, 154, 155, 156, 157, C, D, E, I, K, L, P, R, V. Lmax. 310 mm.

The examined specimens agree very well with the description of the species, with the exception of some specimens, from the stations E and I, in which the number of the tentacles is increased (thirteen or fourteen).

Ecology : In depths from 10 to 90 m (infralittoral and circalittoral zones), in silty or sand silty substrata. According to Perès & Picard (1964), this species is the characteristic one of the homonymous facies that are shown by the biocoenosis VTC in the estuaries. It is also a component species of the biocoenosis VP.

Distribution : In Aegean Sea, mentioned by Steindachner (1891), Marenzeller (1893), Tortonese (1958), Tortonese & Demir (1960), Vamvakas (1971) and Ünsal (1973).

Labidoplax thomsoni (Herapath, 1865)

Labidoplax thomsoni, Clark, 1907, p. 97. – Koehler, 1921, p. 190, fig. 145; 1927, p. 275, pl. 16, fig. 31. – Mayer, 1937, p. 37, fig. 33. – Tortonese, 1965, p. 108, fig. 47.

Material : One specimen, 40 mm long, from the station 156.

Ecology : depth of 27 m (infralittoral zone) in a sand silty substratum.

Distribution : This is the first report of the species from the eastern basin of the Mediterranean. In the rest Mediterranean, known from the gulf of Naples, the Adriatic (Clark 1907) and from the coasts of Libya (Tortonese, 1965).

DISCUSSION

The examined specimens of each species didn't show any remarkable morphological differentiations, with the exception of some specimens of *Labidoplax digitata* (stations E and I) that were found to have 13 or 14 tentacles instead of 12.

Nearly all of the 24 identified species are not well known or are new for the fauna of the North Aegean Sea. Seven of these species are reported here for the first time from the eastern basin of the Mediterranean, three are new for the fauna of the Aegean Sea and five new for the fauna of the North Aegean Sea.

The species *Holothuria (H.) stellati*, *Stereoderma kirschbergi*, *Phyllophorus granulatus* and *Labidoplax thomsoni* can be considered rare for the region examined, and the species *Paracucumaria hyndmanni*, *Havelockia inermis*, *Phyllophorus urna* and *Leptosynapta makrankyra*, moderately rare.

The crinoids *Antedon mediterranea* and *Leptometra phalangium* are endemic species of the Mediterranean (Tortonese 1965, Gamulin-Brida, 1976). Five of the holothuroid species (*Holothuria* (*H.*) *helleri*, *Thyone cherbonnieri*, *Phyllophorus urna*, *P. granulatus*, *Leptosynapta makrankyra*) are known only from the Mediterranean, while the rest seventeen are also inhabitants of the Atlantic (Fredj, 1974). *Holothuria* (*Thymiosyca*) *impatiens* lives also in the Indo-Pacific Ocean (Clark & Rowe, 1971).

The review of the bibliographical information showed that nine more species of holothuroids are known from the Aegean Sea and the greek coasts of the Ionian Sea. These species as well as their finding regions are given below :

Kolga ludwigi Marenzeller : north of Krete, 35° 47' 40" N 23° 33' 30" E and 35° 36' 30" N 24° 32' 10" E; near Kithera, 36° 19' 40" N 23° 16' 20" E (Marenzeller 1893).

Mesothuria intestinalis (Ascanius) : near Antikithera, 35° 37' N 22° 56' 10" E, south of Krete, 34° 46' 20" N 24° 22' 50" E, 35° 3' 40" N 24° 16' 30" E and 35° 11' 30" N 23° 41' 30" E (Marenzeller 1893, as *Holothuria intestinalis*).

Pseudostichopus occultatus Marenzeller : SW of Milos Island, 36° 40' 30" N 23° 51' E SE of Kithera, 36° 5' 30" N 23° 9' 30" E; SW of Kithera, 35° 56' N 22° 55' 40" E, 35° 37' N 22° 56' 10" E and 36° 0' 12" N 22° 59' 6" E; NW of Krete, 35° 47' 40" N 23° 33' 30" E; south of Krete, 34° 46' 20" N 24° 22' 50" E and 35° 3' 40" N 24° 16' 30" E (Marenzeller, 1893).

Pseudocnus koellikeri (Semper) : turkish coasts of the Aegean (Ünsal 1973, as *Cucumaria koellikeri*).

Pseudocnus syracusanus (Grube) : Aegean Sea (Makka-vieva, 1963), turkish coasts of the Aegean (Ünsal, 1973), as *Cucumaria syracusana*.

Leptosynapta inhaerens (Müller) : NE Aegean Sea (Tortonese & Demir 1960); east coasts of Kerkyra-Corfu - (Salvini - Plaven 1977).

Labidoplax (*Oestergrenia*) *adriatica* Heding : Ionian Sea, east coasts of Corfu (Salvini - Plaven 1977).

Labidoplax (*Labidoplax*) *buski* (McIntosh) : Ionian Sea, east coasts of Corfu (Salvini - Plaven 1977).

Labidoplax media Oestergren : West Saronikos Gulf (Vamvakas 1971, as *Oestergrenia media*).

Including the above species, the number of the known holothuroids from the Aegean Sea is 29, while from the North Aegean Sea is 25. It is possible that the species *Labidoplax* (*Oestergrenia*) *adriatica* Heding and *Leptosynapta hispida* (Heller), known from the Adriatic and Black Sea (Bacescu *et al.* 1971; Salvini - Plaven 1972, 1977), exist also in the Aegean Sea.

Up to now, in the entire Mediterranean, five species of crinoids and fifty two species of holothuroids have been found (Sinis 1977). Consequently, the holothuroid fauna of the Aegean Sea constitutes the 56 percent of the entire holothuroid fauna of the Mediterranean and that of the

North Aegean Sea constitutes the 48 percent. Perès (1967) noted that "one finds in the northern Aegean Sea a flora and fauna very similar to those of the northern area of the Western Basin, although some species are missing". If we accept this aspect, it is logical to expect that a more intensive research in the North Aegean Sea, in depths between 100 and 500 m, will prove the existence of at least the most common species of the NW area of the Mediterranean or other mediterranean areas, that have not been found up to now, as the species *Leptosynapta minuta* (Becher), *Neocucumis marioni* (Marenzeller), *Pseudothyone raphanus* (Duben & Koren), *P. sculponea* Cherbonnier and *Thyone gadeana* Perrier. Out of the known mediterranean species that live in depths greater than 500 m, only *Mesothuria verrilli* (Theel) and *Molpadia musculus* Risso have not been reported from the Aegean Sea up to now.

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