

EXOTIC DECAPODS AND A STOMATOPOD OFF RHODES ISLAND (GREECE) AND THE EASTERN MEDITERRANEAN TRANSIENT

BY

BELLA S. GALIL¹) and KOSMAS KEVREKIDIS²)

¹) Israel Oceanographic & Limnological Research, National Institute of Oceanography, P.O. Box 8030, Haifa 31080, Israel

²) TEI Eperou, School of Fisheries & Aquaculture, GR-46 100 Igoumenitsa, Greece

The decapod crustaceans of Rhodes have been studied since the early 20th century (Parisi, 1913; Colosi, 1923; Santucci, 1928; Maldura, 1938; Tortonese, 1947a, b; Kinzelbach, 1965, 1970; Lewinsohn, 1976; Thessalou-Legaki, 1986; Thessalou-Legaki et al., 1986, 1989; Kevrekidis & Kevrekidis, 1996, 1997; Kevrekidis et al., 1998; Pancucci-Papadopoulou et al., 1999; Koukouras & Dounas, 2000). In particular, the aim of the 1970 joint American-Israeli expedition was to investigate whether the Indo-West Pacific (IWP) biota invading the Mediterranean through the Suez Canal had reached Rhodes (Lewinsohn, 1976; Barash & Danin, 1988). Lewinsohn (1976) recorded no exotics among the 29 species collected (six sites, mostly intertidal to 6 m, few deeper samples up to 65 m, and market-bought), but cautioned “Es muss dabei noch einmal betont werden, dass die Arbeit nicht genügend war und damit das Fehlen der Indo-West Pazifischen Arten nicht bewiesen ist”. Barash & Danin (1988) considered Rhodes to belong biogeographically to the Aegean Sea, so it was deemed that “Further work in Rhodes can be discontinued, unless different conclusions should result from the processing of material. It seems that the Indo-Pacific influence is very restricted”. The 1983-84 study of benthic macrofauna off NW Rhodes (mostly deep water sites, only five between 30 and 63 m) recorded no exotic crustaceans either, and the authors attributed the presence of two exotic decapods reported from Rhodes (Kevrekidis & Kevrekidis, 1997) to ephemeral incursion or mariculture (Pancucci-Papadopoulou et al., 1999).

Thirteen sites, on both the Levantine and Aegean shores of Rhodes, at depths between 14.5 and 64 m, were sampled by trawl between 1995 and 1999 (fig. 1, table I). The specimens are deposited in the School of Fisheries and Technology, Igoumenitsa, TEI Eperou. Seven IWP species have been recorded since 1995, three of which constitute new records. The material from stations marked by an asterisk was published previously; cl = carapace length.

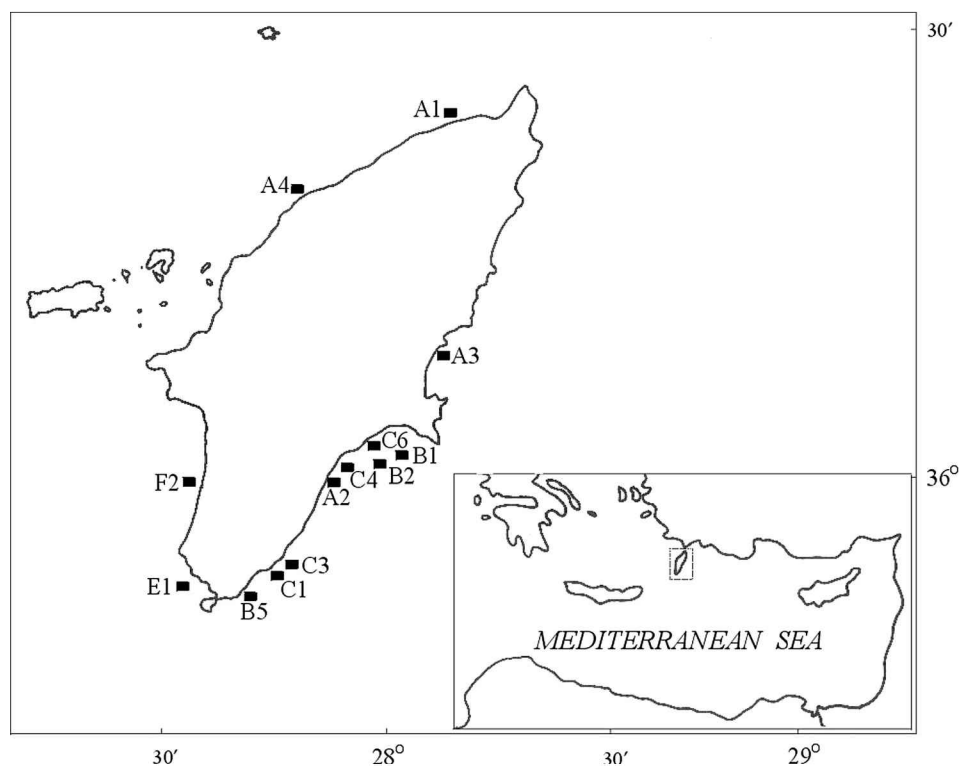


Fig. 1. Location of sampling stations.

TABLE I
Station data

Station	Date	Depth (m)
A1 Aerodromio	13.iii.1995	29-31
A2 Genadi	23.iii.1995	14.5-22
A3 Haraki	24.iii.1995	14.5-40
A4 Kameiros	26.iii.1995	47-64
B1 Pefkoi-Kiotari	3.x.1996	20-29
B2 Genadi-Pefkoi	3.x.1996	29-31
B5 Prassonisi-Plimmiri	4.x.1996	18-47.5
C1 Plimmiri-M. Kavos	29.x.1997	33-51
C3 Lahania-Plimmiri	30.x.1997	33
C4 Genadi-Kiotari	30.x.1997	31-49
C6 Lardos-Kiotari	30.x.1997	18.3-20
E1 Ktenia I.-Mandilas	20.xi.1999	29
F2 Strogillo I.-Ctenia I.	21.xi.1999	29.7-40

RESULTS

Marsupenaeus japonicus (Bate, 1888)

Penaeus japonicus, Kevrekidis & Kevrekidis, 1996.

Material examined. — Stn A1*, 1 ♂ 44 mm cl; Stn A2*, 1 ♂ 52 mm cl; Stn A3*, 1 ♂ 22 mm cl; Stn A4*, 1 ♂ 43 mm cl; Stn B5, 1 ♂ 46 mm cl; Stn E1, 1 ♂ 37.2 mm cl, 1 ♀ 49 mm cl.

Remarks. — The native penaeid prawn, *Penaeus (Melicertus) kerathurus* (Forskål, 1775), was reported off Rhodes (Maldura, 1938; Tortonese, 1947a), but we failed to collect it. It might have been outcompeted by the exotic penaeid reported here (d'Udekem d'Acoz, 1999).

Metapenaepsis aegyptia Galil, 1990

Metapenaepsis aegyptia, Kevrekidis et al., 1998.

Material examined. — Stn B1*, 2 ♂♂ 21, 22 mm cl, 10 ♀♀ 22-28 mm cl; Stn B2*, 1 ♂ 22 mm cl, 4 ♀♀ 23-27 mm cl; Stn F2, 2 ♀♀ 18.2, 18.7 mm cl.

Remarks. — In our samples *M. aegyptia* outnumbered *Trachysalambria palaestinensis* (Steinitz, 1932). Though the presence of the latter species was established in the Mediterranean as early as 1924-1925 (Steinitz, 1929), its populations along the Israeli coast lag behind those of the more recent arrival, *M. aegyptia* (cf. Galil, 1999). It is interesting that the species' relative abundance in Rhodes resembles the current standing rather than the historical succession.

Metapenaepsis mogiensis consobrina (Nobili, 1904)

Metapenaepsis mogiensis consobrina, Kevrekidis et al., 1998.

Material examined. — Stn A3*, 1 ♀ 24 mm cl; Stn B1*, 1 ♀ 37 mm cl; Stn C6, 1 ♀ 22.9 mm cl.

Trachysalambria palaestinensis (Steinitz, 1932)

Trachypenaeus curvirostris, Kevrekidis et al., 1998.

Material examined. — Stn A3*, 1 ♀ 23 mm cl; Stn B1, 1 ♀ 21.5 mm cl.

Ixa monodi Holthuis & Gottlieb, 1956

Material examined. — Stn F2, 1 ♂ 16.6 mm cl.

Remarks. — *I. monodi* was first collected in the Mediterranean in 1955 in Mersin Bay, southeastern Turkey (Holthuis & Gottlieb, 1956). Later it was recorded off the Israeli coast (Golani et al., 1983), where it is rather common (CIESM Atlas of exotic decapod and stomatopod species). New record for Rhodes.

Charybdis (Goniohellenus) longicollis Leene, 1938

Material examined. — Stn B1, 1 ♂ 44 mm cl; Stn C1, 1 ♂ 15 mm cl, 1 ♂ 11.5 mm cl; Stn C3, 2 ♂♂ 11, 31 mm cl; Stn C4, 3 ♂♂ 9-26 mm cl, 1 ovigerous ♀♀ 25 mm cl; Stn C6, 1 ♂ 10 mm cl; Stn F2, 1 ♀ 15.2 mm cl.

Remarks. — New record for Rhodes. Abundant off the southeastern coast of the island.

Erugosquilla massavensis (Kossmann, 1880)

Material examined. — Stn B1, 1 ♂ 22.9 mm cl.

Remarks. — *E. massavensis* was collected in the Bay of Fethiye, southwestern Turkey in 1976 (Kocataş, 1981), and off the northern coast of Crete in 1991 (Dounas & Steudel, 1994). New record for Rhodes.

DISCUSSION

Rhodes, the largest island in the Dodecanese, straddles the Aegean and Levantine Seas. The main hydrological features nearby are the Rhodes cyclonic gyre, southeast of the island, the typical formation site of the Levantine Intermediate Water mass (Nittis & Lascaratos, 1999), and the Asia Minor Current (AMC) that runs along the Anatolian coastline carrying westwards warm, salty water from the Levantine Sea and passing northward through the eastern Cretan Arc Straits, mainly the Rhodes and Karpathos Straits.

A persistent drought in the period 1988-1992 and changes in the water mass pathways initiated a 1-4 times increase in salt transport from the Levantine into the Aegean in the upper 200 m layer between 1987 and 1994 (Theocharis et al., 1999). In 1991, the source of the Eastern Mediterranean Deep Water shifted from the Adriatic to the southern Aegean Sea (Theocharis et al., 1992), though the process might have started as early as 1987. The increased outflow of the newly formed, denser water through the Cretan Arc Straits into the eastern Mediterranean has been compensated for by inflowing Levantine surface and intermediate water (Wu et al., 2000). The significant changes in the South Aegean water mass characteristics, which have considerably influenced the thermohaline circulation of the eastern Mediterranean, have been termed the Eastern Mediterranean Transient (EMT) (Lascaratos et al., 1999; Theocharis & Lascaratos, 2000).

The sudden influx of IWP exotic decapods and one stomatopod into the southeastern Aegean in the past decade is attributed herein to the augmented salinity and to the more extensive inflow of the AMC, transporting warm, saline

waters of Levantine origin and their biota through the Rhodes and Karapathos Straits.

The evolution of the EMT has far-reaching implications not only in terms of the formation and spreading of water masses and their biogeochemical components, but for the invasion dynamics of the Red Sea exotics in the eastern Mediterranean as well.

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