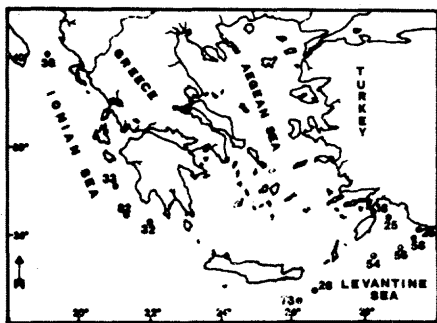


On the vertical distribution and composition of deep-water Copepod populations in the Eastern Mediterranean Sea

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As few studies have been carried out on the synthesis and vertical distribution of deep-water copepods in the Eastern Mediterranean Sea (Greze, 1963; Delalo, 1966; Vaissière & Seguin, 1980; Scotto di Carlo & Ianora, 1983), our knowledge on this subject is still far from being complete. Within the framework of the "Open Sea Oceanography" project, during March 1986 and 1988, zooplankton samples were collected from different layers from the surface to the bottom with a WP-2 closing net at 12 stations situated in the Ionian and Levantine Seas (Fig. 1). The results presented here come from the analysis of samples collected at depths greater than 500m up to 4800m (Vavilov deep). Only for two stations the first examined layer was 250-1000m and 300-1000m respectively.

The density (individuals per cubic meter) revealed differences between layers as also between areas. In the Levantine Sea, it varied from 0.38 to 3.66 ind/m³ and in the Ionian from 3.89 to 6.51 ind/m³, for the 500-1000m layer. The latter values are in accordance with those recorded by Scotto di Carlo et al. (1984) in the Tyrrhenian Sea. From 1000 to 2000m values ranged between 0.18 and 1.27 ind/m³, while below 2000m density did not exceed 0.1 ind/m³. A total of 98 copepod species were identified, their number decreasing with depth. Among those of the deeper layer, some individuals of species usually inhabiting the upper layers were found and must be probably considered as contaminants (*Oncaea media*, *Oithona plumifera*, *O. helgolandica*, *Lucicutia flavicornis*, *Corycella rostrata*, *Euaetideus giesbrechti* and *Mecynocera clausi*). However, we must point out that, in the Eastern Mediterranean, the water temperature below 500m is higher than that of the western Mediterranean (Miller et al., 1970) and this might explain the presence of surface species in deeper layers. Another point worth mentioning is the presence of many carcasses below 1000m, especially in the Levantine Sea, as well as some unidentified Calanoida (adults and copepodites).



From our results, the prevailing species for the 500-1000m layer were: *Eucalanus monachus* (the most abundant in both seas), *Oncaea mediterranea*, *Spinocalanus* spp., *Clausocalanus* spp., *Haloptilus longicornis* and *Mormonilla minor*. It is notable that the latter was not found at stations 25, 26, 54, 56 and 58, while it was present at the neighbouring stations 18 and 28. The abundance of *H. longicornis* and *E. monachus* in the Eastern Mediterranean in comparison with that of the Western Mediterranean has also been reported (Scotto di Carlo and Ianora 1983).

Below 1000m, relatively few species were found, the most common being *E. monachus*, *Oncaea* spp. and *Clausocalanus* spp.. Two species, namely *Lucicutia longispina* and *Lucicutia longiserrata* were found only below 1000m. As for the deeper examined layer (3000-4800m), very few copepods were found, most of them surely contaminants from the above layers. At layers deeper than 1000m we must also mention the presence of a discrete number of copepodites, mainly belonging to the genus *Clausocalanus*, *Calanus*, *Lucicutia*, *Pleuromamma* and some unidentified, as well as some copepod nauplii up to 4800m.

For many of the recorded species our results showed a quite similar vertical distribution with those of previous works in the same layers either in the Western or in the Eastern Mediterranean. However, some differences exist, related to several species. So, as for *Lucicutia curta*, this species in our samples seems to have a very wide migration or wider distribution in relation with previous informations. The species *Monacilla typica* and *Gaetanus kruppi* were not found below 1000m, while they have been referred deeper at the same areas. This could be attributed to their low abundance in the Eastern Mediterranean, according also to Scotto di Carlo and Ianora (1983). On the contrary, *Mormonilla minor* seems to have a wider distributional spectrum than previously referred, because we found it up to the greatest depth (4800m). As for *Oithona helgolandica* and *Oithona plumifera*, their vertical distribution seems to be extended up to 1000m, while their presence in deeper water may be considered as contaminant. *Eucalanus elongatus*, already referred up to 2000m for the Ionian Sea (Scotto di Carlo & Ianora, 1983) and in the layer 100-500 for the Levantine Sea (Delalo, 1966), did not appear in our samples below 500m.

Of the 98 identified species, we must point out that :

- 14 (*Clausocalanus jobei*, *C. lividus*, *C. mastigophorus*, *C. parapergens*, *Diaixis pygmaea*, *Euchirella rostrata*, *Gaetanus kruppi*, *Haloptilus angusticeps*, *H. spiniceps*, *Lucicutia lucida*, *Oncaea notopus*, *O. obscura*, *Pleuromamma robusta* and *Scolecithricella tenuiserrata*) are recorded for the first time in the Levantine Sea.
- 2 (*Calocalanus adriaticus* and *Chiridius armatus*) consist first record for the Ionian Sea.
- 2 (*Clausocalanus pergens* and *Heterorabdus spinifrons*) are first records for both Seas.
- 1 (*Euchirella intermedia*) is first record for the Eastern Mediterranean Sea.
- 1 (*Lucicutia longispina*) is first record for the Mediterranean.

These results must urge us to continue our investigations on the deep water zooplankton, trying to give answers to the many problems concerned.

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