

Epipelagic copepods of the South-Eastern Mediterranean,

General Remarks

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Abstract

The epipelagic copepods constitute the major part of the zooplankton community in the south-eastern Mediterranean waters off the Egyptian coast. The interesting changes in the biomass and seasonality of the copepod populations observed in the post-high Aswan Dam period are discussed.

Introduction

Important changes have taken place in the biological productivity of the south-eastern Mediterranean as a result of the erection of the high Aswan Dam and the subsequent curtailment of the flow of Nile flood water into the Mediterranean. Since its completion in 1965 immediate effects has been observed in the disappearance of the autumnal bloom of phytoplankton and the drastic decline of sardine fishery. The present paper deals with the effect of the High Dam on pelagic copepods, the dominant component of zooplankton in the area, and summarizes our present knowledge on the species composition, magnitude and seasonality of the standing crop of pelagic copepods. The data presented are based on the results obtained during 1961 (Dowidar and El-Maghraby 1970), 1966 (Dowidar & El-Maghraby 1973) and 1970-71 (Mussein, 1977).

Discussion

The standing crop:

Available informations on the size of the standing crop of pelagic copepods off the Egyptian coast prior to the construction of the High Dam are limited to the coastal Zone (<50 m depth contour) of Alexandria and Abukir regions (Dowidar & El-Maghraby 1970). In both regions the annual average of copepod density during 1961 was 11500 ind./m³ and 22400 ind./m³ respectively. Peaks of abundance were recorded in spr-

ing and autumn, the latter was by far more pronounced. The high density of the autumn peak (maximum 36900 ind./m³ off Abukir) coincided with the Nile flood season which induced immense phytoplankton blooms and enhanced egg production and growth of most copepod species in the circum-littoral region. This pattern of seasonality seem to be a common feature of copepods in the eastern Mediterranean (Lakkis, 1976; pasteur et al 1976). Directly after the complete retention of the Nile flood south of the High Dam, the standing crop of copepods decreased considerably. The decrease which was clearly demonstrated in 1966 was more pronounced in 1970-71 (Table 1). The mean population density in the whole area varied from 2740 ind./m³ in 1966 to 1260 ind./m³ in 1970-71. Although the population in the whole area has declined, the coastal zone off the Nile Delta (affected by land run off) maintained comparatively the highest crop. The numerical abundance of copepods in the coastal and oceanic zones was roughly in the ratio of 6:1 in 1966 and 6:1-11:1 in 1970-71.

Table 1: Mean annual values of the standing crop of copepods (ind. m⁻³) at different depth zones in the study area during 1966 and 1970-1971.

	depth Zones			Mean
	0-50 m	50-200 m	200 m	
<u>1966</u>				
Off Abu Kir	7220	2460	1130	3600
Off Nile Delta (1)	6440	1480	950	2960
Whole area (2)	5900	1420	890	2740
<u>1970-1971</u>				
Off Abu Kir	4360	550	380	1760
Off Nile Delta (1)	3510	560	400	1490
Whole area (3)	2700	630	450	1260

(1) Mean of 3 sections between Abu Kir and Damietta.

(2) Mean of 6 sections between Arabs Gulf and El-Arish.

(3) Mean of 6 sections between Salloum and Damietta.

Not only the standing crop has declined but the pattern of seasonality of the annual peaks was also altered. The annual cycle is still bimodal. In 1966 peaks of numerical abundance occurred also in spring and autumn, but unlike the condition prior to 1965 the spring peak was more pronounced. In 1970-71 the two peaks were recorded in wint-

er and summer with the minimum standing crop in autumn. The decrease in the numerical abundance of the copepod populations in the southeastern Mediterranean since 1965 and the alteration in the seasonality of the annual peaks are undoubtedly a direct result of the cessation of the flow of Nile flood water into the area. Whether these changes prevail also in other Mediterranean regions of the Eastern Mediterranean could not be traced from available literature.

Copepod Species

The list of pelagic copepods, so far, identified from the southeastern Mediterranean waters off the Egyptian coast comprises about 180 species (Dowidar, in press). Out of this number about 50 species belong to the bathy-pelagic fauna. These forms occur irregularly in the epipelagic with greater frequency in winter. Many of them perform wide diurnal vertical migration and were caught in night hauls during summer. The species density of copepods is thus fairly diversified and is comparable to that of the Adriatic sea from which a total of 218 species are known including 137 epipelagic species (Hure et al, 1980). The number of copepod species recorded in other eastern Mediterranean regions is, however comparatively low probably due to lack of intensive study (Berdugo, 1968; Berdugo and Kimor, 1968; Kio-rtis et al 1969; Lakkis, 1976). However, with few exceptions all the species recorded from the Israeli and Lebanon coasts as well as from the Aegean sea are included in our list. Furthermore, not only the composition of the population in these regions is similar, but the neritic communities are also dominated by almost the same species viz: Paracalanus parvus, Oithona nana, Euterpina acutifrons, Centropages Kroyeri, C. violaceus, Isias clavipes, Temora stylifera, Acartia clausi, Acartia latisetosa, Clausocalanus furcatus, C. arcuicornis and oithona plumifera. Presumably the order of abundance of these species varies in different regions. These characters may indicate a general homogeneity of the copepod fauna of the Eastern Mediterranean.

On the other hand while the majority of the copepod fauna of the Mediterranean belong primarily to the Mediterranean-Atlantic fauna, the eastern Mediterranean, on account of its special ecological features, is characterized by a preponderance of tropical-subtropical elements. About 40%-50% of the species recorded are known from the Red sea and Indo-west pacific.

The problem of immigration of Red Sea copepods through the Suez Canal needs further investigations. So far only few species have been reported as new immigrants in the Eastern Mediterranean e.g. Calanopia elliptica, C. media, Arietellus aculeatus, Centropages ponticus, Labidocera madurae, L. detruncata, Acartia centrura and A. fossae (Berdugo; 1968; Lakkis 1976). However due to the presence of many examples of identical species on both sides of the Canal, several species may have passed unnoticed. In this respect the occurrence of Paracalanus aculeatus and calocalanus pavo, in comparatively large numbers east of port said may indicate their enrichment from Red Sea stocks through the Suez Canal.

On the other hand many of the species listed as Atlantic indicators in the Western Mediterranean (Gaudy 1962, Furnestin, 1966) are recorded in the eastern basin particularly the south-eastern and eastern regions. Some of them have become important as biomass builders (Dowidar & El-Maghraby 1973; Lakkis 1976; Pasteus et al 1976).

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