

DISTRIBUTION OF THE CALANOID COPEPODA ALONG THE GULF OF ELAT  
( AQABA ), RED SEA

by M.S.de Almeida Prado Por  
Institute of Oceanography, University of  
Sao Paulo Brasil and Department of Zoo-  
logy, the Hebrew University Jerusalem  
Israel.

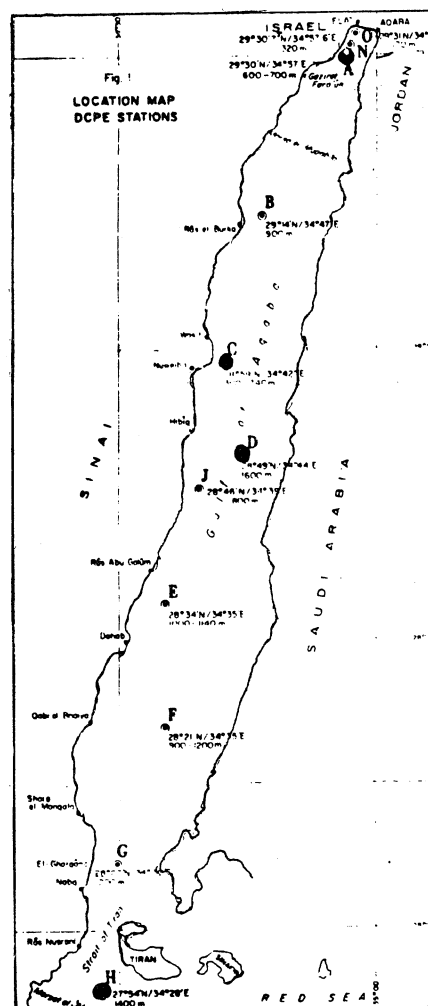
ABSTRACT

The distribution of the Calanoida (Copepoda) along a N-S axis in the Gulf of Elat (Northern end, middle of the Gulf and outside the Straits of Tiran) was studied. Species composition appears to be fairly uniform, with a slight tendency of increasing species diversity towards South. Some data on seasonal and diurnal vertical migration are added.

RESUME

*La distribution géographique des Calanoides dans le golfe d'Elat est étudiée sur prises provenant du Nord et du milieu du golfe, ainsi que d'une station en dehors du détroit de Tiran. L'inventaire des espèces est plus ou moins uniforme et la diversité légèrement élevée vers le sud. Des données préliminaires sur la migration verticale saisonnière et circadienne sont ajoutées.*

A first report on the planktonic Calanoida of the Gulf of Elat was presented by Almeida Prado Por and F.D.Por (1981). The diversity and dynamics of the Calanoida in St.A in the Northern Gulf was analyzed in further detail (Almeida Prado Por 1983), based on the Data Collecting Programme of the Gulf of Elat (DCPE). Though species composition is typically tropical, a marked seasonality was observed. Maximum mean densities were recorded in March and minima in July. The March peak accompanies the seasonal diatom peak (Kimor and Goldansky, 1977) which occurs during the short period of vertical mixing of the water column following the disappearance of the weak thermocline in the waters of the Gulf.



The small herbivores are the dominant species. The vertical distribution of the Calanoida is almost entirely confined to the uppermost 300 meters and below this level the densities drop abruptly. Within these limits there is a seasonal variation in the vertical distribution: for instance, Mecynocera clausi and Acartia negligens were distributed over a deeper column in March than in July,

For the present study three sets of samples were chosen for the months of March and July 1975, namely stations A, D and H for March and A, C and H for July (See map). Station A represents the Northern Gulf, C and D the Central Gulf, while station H is situated outside the Strait of Tiran, in the open Northern Red Sea. The two months were chosen as representing respectively the highest density month (March) and the lowest density month (July). The list of the recorded species is as follows:

<i>Calanus minor</i>	<i>Ctenocalanus campaneri</i>
<i>Calanus lighti</i>	<i>Ctenocalanus tageae</i>
<i>Rhincalanus nasutus</i>	<i>Euchaeta concinna</i>
<i>Mecynocera clausi</i>	<i>Phaena spinifera</i>
<i>Undinula vulgaris</i>	<i>Scolecithricella auripectens</i>
<i>Acrocalanus gracilis</i>	<i>Temoropia mayumbaensis</i>
<i>Acrocalanus longicornis</i>	<i>Pleuromamma indica</i>
<i>Calocalanus pavo</i>	<i>Centropages elongatus</i>
<i>Calocalanus pavoninus</i>	<i>Lucicutia flavicornis</i>
<i>Calocalanus styliremis</i>	<i>Haloptilus longicornis</i>
<i>Paracalanus indicus</i>	<i>Paracandacia truncata</i>
<i>Clausocalanus farrani</i>	<i>Pontellina plumata</i>
<i>Clausocalanus furcatus</i>	<i>Acartia negligens</i>
<i>Clausocalanus arcuicornis</i>	

This is a species composition which is radically different from that of the geographically near Eastern Mediterranean.

Species composition in the three areas is fairly uniform in the two analyzed months. There is, however, a tendency of increase in the species diversity towards the South: In March respectively in July, Station A contained 19 respectively 18 species; Stations C and D, 21 respectively 19 species and Station H, 25 respectively 24 species.

These data are consistent with the distributional pattern shown by other taxa of zooplankton in the Red Sea.

Most of the species are distributed throughout the Gulf of Elat and in the Northern Red Sea. Till now, only Calanus lighti is missing from the intensively investigate Station A and therefore might characterize the more Southern waters. In the present comparative material Calocalanus styliremis, Acrocalanus gracilis and the deepwater species Scolecithri-  
cella auropectens and Haloptilus longicornis appeared only in the southern stations. They are however known from Station A in samples collected in other seasons.

There is a marked decrease in the density of the calanoid populations during the oceanographic winter (March), from Station A to Station H. The peak at Station A is formed by the abundant populations of the small grazers Clausocalanus furcatus, Ctenocalanus tageae and Ctenocalanus campaneri. In the summer (July) the densities along the Gulf were fairly uniform and low, with Necynocera clausi as the characteristic dominant species.

A study of the vertical migration of the Calanoida at Station A is being presently carried out in cooperation with Dr. A. Milstein from the Fishbreeding Laboratory, Dor, Israel.

Preliminary results indicate that there are differences in the pattern of migration among the different dietary groups, i.e. the herbivorous, omnivorous and predator calanoids.

The small herbivores exhibit a marked diurnal vertical migration, especially in the upper 300 meter layer. A reduced number of these small herbivores remain however more or less permanently below 400 meters. Larger forms, like Rhincalanus nasutus exhibit a wide range of vertical migration. There seems to be no permanent deep water plankton and all the species found till now are migrating.

Our preliminary data indicate also that there is a marked phenomenon of midnight sinking. It is considered that the waters of the Gulf of Elat, where there is no chemo- and oxycline and where the thermocline is very weak, offer excellent opportunities for the study of vertical migration. In the narrow and extremely deep gulf, the study of vertical migration is also technically extremely easy.

#### General conclusions

Despite the fact that the Gulf of Elat is a nearly landlocked marine waterbody, the composition of its Calanoid fauna is typically oceanic. There are practically no species that can be considered to belong to a neritic association.

Because of extremely poor productivity, the calanoid plankton of the Gulf may be compared to the plankton of the oceanic gyres. It is a typical tropical plankton. As a general trend, the species diversity

decreases from South to North. On the other hand, however, population densities increase towards North. This trend has to be related to the more marked seasonality, which leads in the Northern Gulf of Elat to a short, but very significant winter turnover (Reiss and Hottinger, 1984).

## REFERENCES

- Almeida Prado-Por, M.S. 1983. The Diversity and Dynamics of Calanoida (Copepoda) in the Northern Gulf of Elat (Aqaba) Red Sea. *Oceanologica Acta* 6(2):139-145
- Almeida Prado-Por, M.S. and F.D. Por, 1981. First data on the Calanoida (Copepoda) of the Northern Gulf of Elat (Red Sea). *Rapp. Comm. Int. mer. Medit.* 27(7):173-174.
- Kimor, B. and B. Goldansky, 1977. Mikroplankton of the Gulf of Eilat. Aspects of Seasonal and Bathymetric Distribution. *Mar. Biol.* 42:55-67
- Reiss, Z. and L. Hottinger, 1984. The Gulf of Aqaba. Ecological Micropaleontology. Ecological Studies 50. Springer Verlag. 354 p.