

Notes on the Occurrence and Distribution of some Zooplankton species in the Mediterranean waters of U.A.R.

by

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During the cruises of the Russian oceanographic vessel *Ichthyolog* in the Mediterranean waters of Egypt in 1966, 120 zooplankton samples were collected. These were procured from vertical hauls of not more than 110 m depth operated in the surface waters of the oceanic and neritic zones. It is aimed in this paper to give some notes on the occurrence and distribution of the permanent zooplankton species identified in these samples with special emphasis on the copepods.

I. — Crustacea

1 - Copepods

The copepods, the most important constituent of the zooplankton community in the area (average 77.0 %), were represented in all the samples with 132 species, of these 25 species, exclusively recorded in the offshore waters were new records to the area. GRESE *et. al.* [1968] recorded as much as 200 copepod species in the Adriatic Sea. HURE & SCOTTO DI CARLO [1968] listed 157 copepod species from the Gulf of Naples and Southern Adriatic. Excluding the bathypelagic species in their list, most of them are recorded in our Mediterranean waters. With the exception of the Adriatic Sea, the number of epipelagic copepods recorded in various Mediterranean regions varies from 120-141 species [SEWELL, 1948; GRESE *et al.*, 1968]. With such a variety of species, the south eastern Mediterranean could be regarded as one of the qualitatively rich areas in its copepod species.

The numerical abundance of the copepod population in the area was (as previously shown by DOWIDAR & EL-MAGHRABY, 1970) limited to some 10 of small size neritic species. The greater number of species were less frequent or even rare and mostly represented in the offshore waters.

The majority (90 %) of the species recorded in the samples belong to the Mediterranean-Atlantic-Indo Pacific Fauna and are all recorded in the Western Mediterranean. According to SEWELL [1948] two of the species recorded namely, *Ctenocalanus vanus* and *Pseudocalanus elongatus* are known from boreal or Arctic regions; on the other hand, four of them viz : *Labidocera brunescens*, *Acartia adriatica*, *Acartia latisetosa* and *Corycaeus brehmi* are known to be of Mediterranean origin.

Some of the species recorded in our area are considered by several authors [MAZZA, 1963; GAUDY, 1963; FURNESTIN, 1963, 1966; etc...] as indicators of the Atlantic current in the Mediterranean. FURNESTIN [1966] classified such Atlantic indicators in the western basin into two categories; **a.** those that are adapted to the Mediterranean environment and are able to breed in it; of these *Oithona nana*, *Paracalanus parvus* and *Temora stylifera* occur in large numbers in our waters. On the other hand, the following species given by FURNESTIN (*loc. cit.*) under this category namely, *Diaxis pygmaea*, *Centropages typicus*, *Anomalocera patersoni*, *Pontella lo biancoi*, *Pontella mediterranea*, *Parapontella brevicornis* are of rare occurrence in our area. It seems that through their eastward transport such species find the conditions in the eastern Mediterranean not favourable for them to breed and for their offsprings to metamorphose and thus they eventually become very rare. Their occurrence in the eastern Mediterranean is thus dependent on the Atlantic current. **b.** the second category comprise the species which are more or less difficult

adapted to the new Mediterranean environment. These either penetrate to a short distance or disappear more or less rapidly and are hence considered as true indicator of the Atlantic current. Of this category the following 14 species are recorded with small numbers in our area indicating a more or less successful eastward transport, *Calanus tenuicornis*, *Pseudocalanus elongatus*, *Calocalanus styliremis*, *C. plumulosus*, *Ctenocalanus vanus*, *Pleuromamma abdominalis*, *P. robusta*, *P. xiphias*, *Candacia aethiopica*, *C. bipinnata*, *Pontellina plumata*, *Parapontella brevicornis*, *Acartia danae* and *Corycaeus lautus*.

On the other hand, the following 6 species of this category namely, *Isias clavipes*, *Mecynocera clausi*, *Calocalanus pavo*, *Paracalanus aculeatus*, *Lucicutia flavicornis*, *Centropagus violaceus* are rather frequent and are even able to breed in our waters as indicated by the presence of their juvenile stages in the samples; thus it appears that these species are already established in the eastern Mediterranean. *Mecynocera clausi*, *Calocalanus pavo* and *Centropages violaceus* are listed by BERDUGO & KIMOR [1968] among the common epipelagic species in the eastern Mediterranean. This however does not exclude the possibility of their recruitment by the Atlantic transport. The occurrence of *Paracalanus aculeatus* and *Calocalanus pavo* in fairly large numbers particularly in the eastern sector of the area investigated (off Sinai) may indicate their probable enrichment from the Red Sea population through the Suez Canal. BERDUGO [1968] recorded *Calanopia media* and *C. elliptica* in the eastern Mediterranean and explained their occurrence as due to their infiltration through the Suez Canal from the Red Sea; both species were however not identified in our samples.

2 - Crustaceans other than Copepods

a. CLADOCERA : of the 5 species recorded in the area, *Evadne tergestina* was very common in the neritic coastal waters of El-Arish and Abu Qir regions in summer, rather frequent in autumn and rare or even absent in other sections. This species prove to tolerate a wide range of salinity; it was recorded in Abu Qir Bay in salinities as low as 8 ‰ [DOWIDAR & EL-MAGHRABY, 1971], and in the highly saline waters of the Bitter Lakes, salinity about 50 ‰ [GURNEY, 1927]. *E. spinifera* nearly follows the same pattern of distribution with marked offshore tendency, but never common. *E. nordmanni*, *Podon polyphemoides*, and *P. intermedius* were recorded during the warm months but always rare and irregular. *Penilia ovirostris* was not present in the samples of 1966 but was previously recorded with very few numbers in the neritic waters of Alexandria in 1961-1962 [DOWIDAR & EL-MAGHRABY, 1970]. This species is commonly considered as indicator of waters of low salinity and as indicator in the western Mediterranean [CASANOVA, 1964-65]; however it can afford the high salinity [GURNEY, 1927] of the Bitter Lakes [GURNEY, *loc. cit.*]

b. OSTRACODA : the following species were recorded in our waters : *Conchoecia haddoni*, *C. curta*, *C. elegans*, *C. obtusata* and *Astrope mariae* all are more or less frequent in the western Mediterranean [ROSE, 1957; FURNESTIN, 1965; SEQUIN, 1968]. The first two were rather frequent in the oceanic and offshore waters of the area in all seasons. The other species were rare and of irregular occurrence. *Astrope mariae* was recorded once in the neritic waters of the most western section (Arab's Gulf).

c. AMPHIPODA : The following species were rare, exclusively recorded from the oceanic waters of the area especially the most western section : *Scina crassicornis*, *Vibilia viotrix*, *Phronima stebbingi*, *Ph. colletti*, *Phronimella elongata*, *Euprimno macropus*, *Hyperia latissima*, *Phrosina semilunata*.

II — Other planktonic groups

a. Foraminifera

Of the species identified, *Globigerina bulloides* was the most frequent, being recorded in most of the neritic stations in nearly all seasons. *Hastigerina pelagica*, *Orbulina universa* and *Tretomphalus bulloides* were less frequent and mostly confined to the oceanic waters particularly of the western sections.

b. Radiolaria

Of the 20 species identified in the area, the following were more or less frequent in the neritic waters particularly in summer and autumn : *Collozoum inerme*, *Sphaerouzoum punctatum*, *Myxosphaera* sp., *Cenosphaera inermis*, *Staurosphaera jacobi*, *Haliomma capillaceum*, *Cenellipsis faceta*, *Stylochlamydidium asteriscus* and *Zygothephanus mülleri* While ; *Aulacantha scolymantha*, *Cannobelos cavispicula*, *Spon-*

gastrochus brevispinus were frequent in the oceanic waters. *Hexalonche amphisiphon*, *Heliosoma achnaster*, *Cyphonium ceratospyris*, *Stylodictya multispina*, *Pterocenium pinnatum*, *Sethophormis eupilium*, *Eucecryphalus gegenbauri* and *Gastanidium variabile* were of irregular and rare occurrence in the off-shore waters of the area.

c. *Coelentrata*

Of the Medusae; *Liriope tetraphylla*, *Phialidium hemisphericum*, *Pantochogon haeckeli* and *Obelia* sp. were, at times, rather common in the shore waters; *Rhopalonema velatum* was widely distributed in the oceanic waters though always in small numbers. Of the Siphonophores; the following species were identified : *Muggiaea kochi*, *Eudoxoides spiralis*, *Chelophyes appendiculata*, *Bassia bassensis*, *Abylopsis tetragona*, *Abylopsis eschscholtzi*, *Lensia subtilis*, *L. multicristata* and *Sulculeoaria angusta*. They were more numerous in summer and autumn in the oceanic waters of all sections except at El-Arish, all of them are recorded in the western Mediterranean [TRÉGOUBOFF, 1957; FURNESTIN, 1960, 1966; GAMULIN, 1968].

d. *Chaetognatha*

The following species were identified : *Sagitta* sp., *S. inflata*, *S. bipunctata*, *S. serratodentata*, *S. hexaptera*, *S. friderici*; the last mentioned was the commonest in the neritic waters of the area.

e. *Annelida*

Tomopteris sp., *Vanades cristata*, *Pontodora pelagica*, *Sagittaria krohni* were recorded in small numbers in the offshore waters during the spring and autumn seasons.

f. *Pelagic Mollusca*

Of the Pteropodes the following were identified : *Creseis acicula*, *C. virgula*, *Spiratella inflata*, *S. trochiformis*, *S. bulimoides*, *Hyalocylis striata*, *Peroclis reticulata*, *Clione longicaudata*. *Creseis* and *Spiratella* species are numerous in various localities in the western Mediterranean [FURNESTIN, 1960; RAMPAL, 1963, 1966] some of them are recognized as Atlantic indicators [RAMPAL, 1965]. Of the Heteropods : *Atlanta peroni*, *A. quoyana*, *A. helicinoidea*, *Carinaria mediterranea*, *Janthina fragilis* and *Tethys leporina* were recorded in the oceanic waters of the area in summer and autumn, mostly frequent to the west.

g. *Tunicata*

Appendicularians were the most common, these includes : *Oikopleura longicauda*, *O. albicans*, *O. cophocerca*, *O. dioica*, *Stegosoma magnum*, *Pegalopleura haranti*, *Fritillaria formica*, *F. pellucida*, *F. aequatorialis* and *Appendicularia sicula*. Although several species have marked oceanic tendencies, they were more numerous in the neritic zone. All of them are widely distributed in various regions in the western Basin [TRÉGOUBOFF, 1957; BERNARD, 1958; FENAUX, 1963, 1968]. Salps and doliolids (*Thalia democratica*, *Salpa fusiformis*, *Doliolum denticulatum* and *Doliolum* sp.) were occasionally recorded in single specimens in the oceanic waters during spring and autumn.

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Discussion

Les auteurs indiquent comme probable un « enrichissement » des populations de deux Copépodes, *Paracalanus aculeatus* et *Calocalanus pavo*, à partir de la mer Rouge. Le président remarque qu'ils n'ont pas fourni assez d'arguments pour soutenir cette thèse et les incite à faire de nouvelles observations. En revanche, ils ont beaucoup insisté sur les espèces en relation plus ou moins directe avec l'Atlantique; or, il semble que cet aspect de la question soit ici moins intéressant que le précédent et moins facile à vérifier.

