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STRUCTURE AND DYNAMICS OF ZOOPLANKTON OF THE EASTERN MEDITERRANEAN (MATRUH PROVINCE, EGYPT)

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Abstract. The species diversity of zooplankton in the Eastern Mediterranean (Matruh province, Egypt) is represented by 21 species, 17 of which are holoplankton and 4 are meroplankton. The tendency of an increase in the number of species and the number of copepods from the summer period (5 species) to the winter period (10 species) was noted.

Keywords: Zooplankton, species composition, abundance, biomass, Eastern Mediterranean.

СТРУКТУРА И ДИНАМИКА ЗООПЛАНКТОНА ВОСТОЧНОГО СРЕДИЗЕМНОМОРЬЯ (ПРОВИНЦИЯ МАТРУХ, ЕГИПЕТ)

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Аннотация. Видовое разнообразие зоопланктона Восточного Средиземноморья (провинция Матрух, Египет) представлено 21 видом, 17 из которых являются представителями голопланктона и 4 – меропланктона. Отмечена тенденция

увеличения количества видов и численности веслоногих раков от летнего периода (5 видов) к зимнему (10 видов). Количество видов ветвистоусых раков, напротив – максимально в летний период, снижается осенью и полностью исчезают зимой, то есть происходит изменение сообщества с копепоидного до копеподного. Расчет отношения суточной продукции зоопланктона к его общей биомассе (P/B коэффициент) в летний, осенний и зимний период выявил, что максимальные значения этого показателя наблюдаются в летний период. Значения P/B-коэффициента варьировали в пределах от 0.1 до 0.33, со средним значением по всем станциям равным 0.18. В целом, обилие и продуктивность зоопланктона практически на всех обследованных участках крайне низкие и соответствуют олиготрофным водам Средиземного моря.

Ключевые слова: Зоопланктон, видовой состав, численность, биомасса, Восточное Средиземноморье.

According to the literature and field data, the species diversity of zooplankton is represented by 21 species, 17 species of which are representatives of holoplankton and 4 species belong to meroplankton. In summer 2017, the lowest abundance and species diversity were recorded in the bottom layers and equaled to 32 ind/m³. The average abundance of zooplankton at all sampling stations was 344 ind/m³ (from 12 to 2,156 ind/m³), and the average biomass was 16.7 mg/m³ (from 0.66 to 96 mg/m³). Copepods, in particular calanoids, made the main contribution to the zooplankton biomass. On average, their biomass was 70.5% of the total amount.

In autumn 2017, zooplankton included 19 species, 16 species of which were representatives of holoplankton, and 3 species belonged to meroplankton. Copepoda showed the largest number of species (7) in autumn and in summer. The number of species of this group increased as compared to that in summer. The number of Foraminifera species also increased. At the same time, the number of Cladocera species decreased from four to one. Copepods were dominant and attained more than 70% of the total number. In autumn 2017, zooplankton exhibited low abundance, in most cases not exceeding 700 ind/m³. However, the average abundance calculated for all sampling stations was 807 ind/m³ (20–3,600 ind/m³), which more than 2-fold exceeds the summer values. High abundance was provided mainly by copepodid and naupliar stages of Copepoda. The zooplankton biomass varied from 2 to 230 mg/m³, averaging 49.1 mg/m³. In contrast to summer, the composition of zooplankton included representatives of Heliozoa and several species of Foraminifera.

Winter zooplankton (February 2018) is characterized by poor species composition with the dominance of Copepoda (98% of the total population). The number of copepod species increased, and that of the remaining groups decreased. The horizontal and vertical distribution of zooplankton was regular

in comparison with summer and autumn. The greatest abundance and species diversity were recorded in the near-surface water layer in the 0–3 m horizon. In contrast to summer and autumn, the lowest abundance and species diversity were observed in the surface horizon. The samples revealed no Cladocera, larvae of Polychaeta, Cirripedia and Decapoda as compared to summer and autumn samples. A higher uniformity of zooplankton abundance at different sampling stations was observed as compared to the previous study periods. The zooplankton biomass was more than two times lower than that observed in summer and autumn. The number of species per sample at different stations and sampling horizons ranged from 0 to 9, in most samples the number of species varied from 3 to 5. Some samples from the surface horizon included only nauplii and copepodites of Copepoda.

The calculated ratio of daily production of zooplankton to its total biomass (P/B ratio) in summer, autumn and winter showed the maximum values of this indicator observed in summer. P/B ratio varied from 0.1 to 0.33, with an average value of 0.18 for all the stations. In autumn, the zooplankton production decreased slightly, the maximum values of P/B ratio did not exceed 0.3, the average value was 0.16. The minimum production values were recorded in winter, P/B ratios varied from 0 to 0.16, an average of 0.1. The average values of the ratio from August 2017 to January 2018 were equal to 0.14. These values correspond to those typical of oligotrophic waters and show the natural productive capacity of hydrobionts in the surveyed area of the Mediterranean Sea.

The number of Copepoda species was observed to increase from summer (5 species) to winter (10 species). The number of Cladocera species, on the contrary, is maximum in summer, it decreases in autumn and completely disappears in winter, that is, the community changes from copepodite-cladocern to copepodite community.

The comparison of our results with those previously known for the study area confirms low abundance of zooplankton that is characteristic of oligotrophic waters of the Mediterranean. The distinctions in the composition of dominants that belong to the same large taxa were revealed. On the whole, the abundance and productivity of zooplankton at virtually all the stations are extremely low and correspond to those typical of oligotrophic waters during the period of the lowest plankton abundance. The primary production of phytoplankton in the study period is insignificant, and P/B ratios for planktonic organisms correspond to those typical of oligotrophic waters of the study area.