ENVIRONMENTAL QUALITY OF SOFT-BOTTOM IN HAIFA BAY (ISRAEL): AMPHIPOD ASSEMBLAGES

QUALITÀ AMBIENTALE DEI FONDI MOBILI NELLA BAIA DI HAIFA (ISRAELE): FAUNA A CROSTACEI ANFIPODI

Abstract - Ecological information concerning amphipods and representation of their spatial distribution through GIS provides an estimate of local environmental quality.

Key-words: eastern Mediterranean Sea, Geographic Information System (GIS).

Introduction - Haifa Bay is impacted by urban, industrial and agricultural wastes; the seabed biota is mainly composed of short-lived, opportunistic pollution-tolerant species. The crustacean amphipod assemblages are proposed as descriptors of environmental quality of polluted soft bottoms.

Materials and methods - Amphipod crustaceans, collected at 41 sites, at depths between 5 and 30 m, during monitoring surveys between 2010 and 2014, were analysed. At each site, three replicate samples were collected using a 32×35 cm Van-Veen grab, preserved in 70% alcohol and sieved through a 250 µm mesh. A total of 8413 specimens were identified to 34 genera. Of these, members of 6 genera, which made up about 78% of the total abundance, and considered sensitive to organic enrichment (Borja et al., 2000) were analyzed. We used ESRI ArcGIS 10.2 software to present the spatial spread and display faunal patterns. A distribution map was built by locating samples (including replicates) in 276 points. The number of specimens was presented by 5 size classes and displayed as graduated circles of different size; absence was indicated by a cross-mark.

Results - No variation in abundance was observed for Bathyporeia sp. and Urothoe sp., while unexpected and occasionally increases were detected for the other four taxa (Fig. 1), not directly associated with high organic load. In 2010, Cheiriphotis sp. populations increased in the southern part of Haifa Bay (N=55) whereas Perioculodes sp. populations increased in the northern part of Bay (four sites, 52<N<224). In 2011, in the southern part of Haifa Bay, Cheiriphotis sp. (N=241) and Photis sp. (N=118) populations increased in a highly polluted area (one site), whereas Ampelisca spp. (N=52) and Perioculodes sp. (N=283) populations increased in a nearby yet less polluted area (one station). In 2014, in the northern part of Haifa Bay, a similar event was observed near the Na’aman stream (one site): Cheiriphotis sp. (N=1792) and Photis sp. (N=751) greatly increased; while in a nearby yet less polluted area Ampelisca spp. (N=7) and Perioculodes sp. (N=42) abundances remained low.
Conclusions - With the exception of *Urothoe* sp. and *Bathyporeia* sp., the analyzed taxa represent the most common genera in a highly polluted urbanized bay. Our findings contradict the premise of Borja *et al.* (2000) that species of the genera *Ampelisca*, *Perioculodes* and *Photis* are “very sensitive to organic enrichment and present under unpolluted conditions” (*Cheiriphotis* was not evaluated). We propose that such genera are tolerant of organic enrichment. Their greatly increased abundance in 2014 was concomitant with the establishment of a population of an Erythraean alien species, *Grandidierella bonnieroides* Stephensen, 1948 (Lo Brutto *et al.*, 2016), and merits further research.

References