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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 (*Ampelisca* spp., *Bathyporeia* sp., *Cheiriphotis* sp., *Periocolodes* sp., *Photis* sp., *Urothoe* sp.), 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 *Periocolodes* 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 *Periocolodes* 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 *Periocolodes* sp. (N=42) abundances remained low.

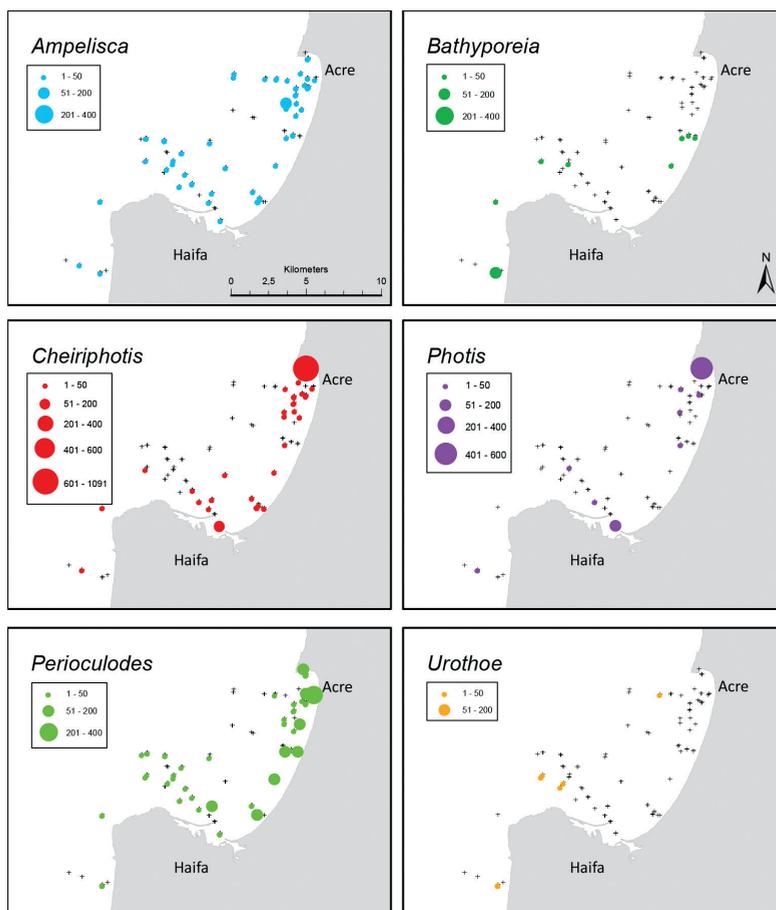


Fig. 1 - Abundance and distribution of 6 amphipod taxa in Haifa Bay (Israel), 2010-2014.

Abbondanza e distribuzione di 6 taxa di anfipodi, nella Baia di Haifa, raccolti tra il 2010 e il 2014.

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*, *Periocolodes* 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

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