

ORGANIC DINOFLAGELLATE CYSTS AS BIO-INDICATOR OF MARINE POLLUTION, SOUTHEASTERN MEDITERRANEAN, EGYPT

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Abstract

This study depends on the detection of water pollution by means of the organic dinoflagellate cysts in bottom sediments collected from the coastal waters, southeastern Mediterranean close to Alexandria, Egypt. For the first time in the Egyptian Mediterranean waters, the dinoflagellate cysts are used as indicators of pollution to formulate environmental considerations on the effects of anthropogenic activity in the Abu Qir Bay. Fifty-two different dinoflagellate cyst morphotypes representing 15 genera were identified in the top 2 cm surface sediments. The most common cysts that were detected (*inter alia*, *Alexandrium minutum*, *A. affine*, *Alexandrium spp.*, *Gymnodinium catenatum*, *Protoperidinium denticulatum*) are capable of producing paralytic shellfish poisoning (PSP), as a result of severe pollution.

Keywords: *Eutrophication, Sewage Pollution*

Introduction

Abu-Qir Bay (Figure 1) which is located between Longitude 30° 50' and 30° 22' E and Latitude 31° 16' and 31° 28' N (about 35 km east of Alexandria), was considered before 1965, as one of the most important breeding and nursery ground for economically important fish and shellfish. The Bay receives considerable amounts of waste waters sources including drainage water from El-Behera province as well as industrial waste from several industries (Tayel, 1992). Such pollutants have a drastic effect on various aquatic fauna and flora.

Question To what extent has the current polluted marine environment effect on dinoflagellate cysts types and distribution in the bottom sediments? The answer to this question is the aim of the present study.

Materials and Methods

Eighteen bottom sediment samples from 18 stations covering nearly different sites of the Bay (Figure 1), were collected, during the end of May and December 2006, using Van Veen grab sampler, in addition to short core sample (~25 cm length). The selected bottom sediments and core samples were treated for palynological study by standard palynological technique for marine sediment. The quantitative and qualitative results for dinocysts identification were based on the published references such as: Fensome et al. (1993), Williams et al (1998), Rochon et al. (1999) and Matsuoka and Fukuyo (2000).

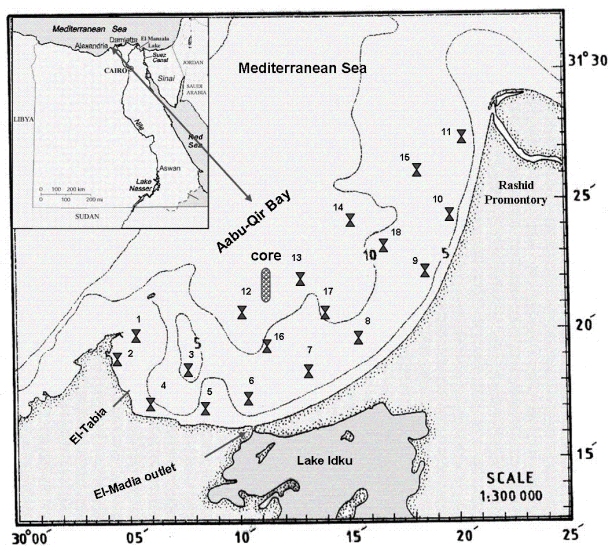


Fig. 1. Location map of Abu Qir bay, showing locations of core and bottom sediment samples

Result and Discussion

Dinocysts abundance varied greatly among studied locations. The high number of cysts was observed in the near shore stations can be explained as the extensive human activities in this area which led to the accumulation of muddy sediments. The number of cysts, particularly heterotrophic ones, (7646 cyst/g) is significantly high (Figure 2), most of them are toxic species.

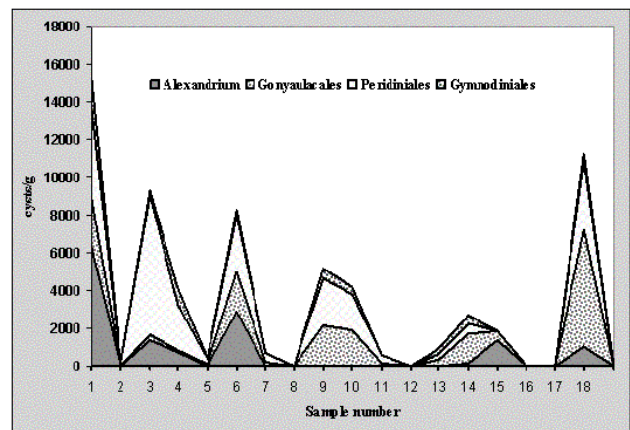


Fig. 2. Diagram showing the concentration of *Alexandrium* and other Cyst orders in the bottom sediments collected during May 2006

Conclusion

1. *Alexandrium* cysts have been seen in surface sediment layers in the vicinity of the most coastal stations. This species was the most abundant of the cyst types in the area. However, *Alexandrium* cysts showed lower surface concentrations or are missing in several stations of the center of the bay.
2. Cysts of three potentially toxic dinoflagellate species, *Alexandrium minutum*, *A. affine* and *Gymnodinium catenatum* were detected at E-Mena, El Madia, in bottom sediments and in the core sediments at 5-15 cm depth.
3. The high concentration and occurrence of dinoflagellate cysts in the Abu Qir Bay are suspected to reflect the serious changes in the environment and anthropogenic activities in that coastal zone.

References

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