

## BENTHIC FORAMINIFERA AS INDICATORS OF POLLUTION IN THE EASTERN MEDITERRANEAN

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A detailed study of foraminiferal populations was carried along the Mediterranean coast of Israel and Turkey.

The primary goal is to investigate the influence of pollution of the eastern Mediterranean marine environment upon the benthic fauna. Foraminifera were chosen to be studied in particular as a representable faunal type.

In order to carry out the primary goal many specialists from the fields of biology, botany, ecotoxicology, natural history, geology, chemistry, and oceanography were involved. Following analyses have been performed or are in progress : (1) Taxonomic and ecological analysis of benthic foraminifera, (2) Experimental ecotoxicological study of transport and defense systems of foraminifera, (3) Geochemical and morphological analyses of foraminiferal tests, (4) Isotope analysis of foraminiferal tests. Foraminiferal parameters were correlated with various oceanographic, sedimentological, geochemical and biological factors (i.e. primary productivity).

Foraminifera show a clear response to various pollution sources such as heavy metals, coal and domestic sewage (YANKO *et al.*, 1994). It supports the feasibility of studying benthic foraminifera as a technique for the *in situ* continuous monitoring of near shore marine pollution. Industrial pollution, especially by coal and heavy metals, has a deleterious effect upon the foraminifera. This is denoted by a reduced population diversity and density, stunting of the tests and increase of percentage of abnormal shells.

This suggests that the defense system of foraminifera may be damaged by xenobiotics. Experimentally a few defense mechanisms have been found and their damage by certain heavy metals (Hg, Pb and Cd) was detected (YANKO and BRESLER, 1994; BRESLER and YANKO, in press).

On the other hand, the foraminifera responded positively to the presence of domestic sewage. Apparently they accept it as a nutrient source. If this is indeed so, the inference may be drawn that benthic foraminifera may be useful not only for detecting anthropogenic pollution, but also natural organic pollution as well. Anomalously large test sizes and species abundance may potentially indicate the presence of naturally occurring organic material. Such may be the case where natural gas seepages occur in the shallow marine environment.

Therefore, the study of shallow water benthic foraminifera has a wide, as yet not completely realized, potential in a variety of fields where the monitoring of the present marine environment or analysis of the paleomarine section is required.

### REFERENCE

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