

MEIOFAUNA IN POLLUTION STUDIES

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Invertebrates play an increasing role in assessing the impacts of environmental deterioration in aquatic ecosystems. Especially several meiofauna taxa have a number of promising characteristics which make them models in benthic oceanic and in freshwater systems for environmental assessments, and approaches in ecotoxicology and ecogenomics. They are small, simple in their organization, widely distributed and commonly abundant in freshwaters, estuaries, the coast, and deep sea. Meiofauna is ecologically important for the structuring of biogeochemical cycles in aquatic systems and their food webs. Some meiofauna taxa transfer pollutants across aquatic food chains – leading to bioaccumulation and biomagnification. In recent years there has been a substantial increase of studies related to biochemical and molecular responses of meiofauna following exposure to physical and chemical environmental disturbances in the field and under laboratory conditions. In the field, several meiofauna taxa serve as bioindicators, and shifts in their presence and abundance that alterate their assemblage and community structures can bioindicate either environmental health or its disturbance. In the laboratory, effects of contrasting wave bands of the electromagnetic spectrum – as prime parameters of global climate change – show striking effects on life table parameters, and on proteomic and gene expression alike, so studied in rotifers and harpacticoids. Pesticides, endocrine-disrupting chemicals (EDCs), or polycyclic aromatic hydrocarbons (PAH), nanoparticles and metals have provided reproducible biological and molecular responses when tested with culturable meiofauna taxa. A systems biology approach that integrates most levels of ecotoxicological integration levels will allow a better understanding of toxicological mechanisms: from effects on gene expression and proteomics, to other biochemical and physiological markers, anatomy, behavior, life table parameters, population dynamics to taxocoenotic changes. Overall objective of the present overview is to update our ecotoxicological knowledge obtained from meiofauna taxa in recent years. Problems, controversies and needs for further studies are highlighted.

Keywords: aquatic pollution, ecotoxicology, environmental assessment, field, laboratory, meiofauna.