

Biomarkers for pollution induced population tolerance assessment: a trial with isopods (Isopoda, Crustacea)

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Pollution induced community tolerance is based on the hypothesis that organisms respond to stress whether it is natural or anthropogenic by either avoiding it, adopting to it, or dying because of it. The result of these stress responses will be the replacement of sensitive individuals by more tolerant. An increase in community tolerance compared to the baseline tolerance at reference sites suggests that the community has been adversely affected by toxicants. The aim of our work is to link the mechanistic bases of stress effects to biologically-significant effects at higher levels of biological organization under controlled laboratory conditions and to make a selection of biomarkers that can be used for pollution induced population tolerance assessment. Studies were done on terrestrial (*Porcellio scaber*) and aquatic (*Asellus aquaticus*) isopods. Isopods play an important role in decomposition of organic matter by fragmentation of dead plant material. They have some remarkable characteristics that make them an excellent organism to study toxicity of chemicals (suitable size, abundance, easy to handle in the laboratory, a lot of knowledge on their biology and ecology). In our approach, feeding rate, energetic reserves (lipids, glycogen, proteins), histological parameters (morphometric analyses of digestive glands), respiratory electron transport system (ETS) activity and behavioural parameters are coupled with biochemical (activity of AChE, GST, GRx, GPx) biomarkers. We succeeded to establish a link between biomarkers at different levels of biological organization in isopods for testing toxicity of two metals with different mode of toxic action (copper and cadmium) and of an organophosphorous pesticide diazinon. This can serve as a model system that allows us to study the impact of pollutants on the physiology and performance of individuals. In addition, we propose a set of biomarkers to be used for quantification of pollution induced population tolerance of the field populations to assess the effects of toxicants in biotic communities.