

Tropical Ecotoxicology

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The Tropical Ecotoxicology session held at the SETAC 2010 Europe annual meeting provided presentations dealing with new ecotoxicological approaches designed to meet requirements of tropical regions, on the validation of new methods and the comparison with existing methods, and on the potential applicability of new and existing ecotoxicological test methods for risk assessment in tropical regions. The session was aimed at getting an overview of current scientific developments with respect to our understanding of environmental problems in tropical regions, and applicability of scientific concepts and models of risk assessment developed for temperate regions. The topic of the session reflects the increasing use of chemicals in tropical regions as well as the increasing attention that's being paid to environmental problems specific to the tropics.

Tropical and temperate regions are ecologically different. Higher temperatures, greater water stress for animals and plants, higher organic matter turnover, faster oxidation-reduction activities, and anthropogenic modifying factors (*e.g.*, eutrophication and desertification) are some of the distinguishing factors of tropical ecosystems.

Inter- and intra-specific relationships between species and ecological mechanisms do not show major differences along latitudinal gradients, in spite of the obvious increase in biodiversity from the poles to the tropics. High biodiversity might or might not lead to functional redundancies. It is at least theoretically possible to have reduced biodiversity with no functional changes.

The increasing agricultural and industrial activities in tropical regions, and the concomitant increasing use of pesticides and industrial chemicals warrant tools and methods that take into account the specific conditions of tropical environments. This could include the use of new test substrates representative of tropical regions or making use of materials readily available in these areas, the use of 'new' test species that are more ecologically relevant for the tropics, or the performance of tests at conditions reflecting tropical environments.

Risk to biodiversity associated with the application of models developed for temperate regions also need to be reassessed in face of the tropical reality. Indeed, the development of ecotoxicology in the tropics is dependent upon the use of appropriate tools that recognize the biological complexities and develop local management models to prevent the loss of valuable ecological services.

Session Highlights

Kees van Leeuwen shared with us some lessons to be learned from a SAICM Regional Training Workshop on Risk Assessment held in Africa (reported earlier in the SETAC Globe). This workshop provided a useful basis for risk assessment, but was also useful as a platform to exchange experiences between participants from different African countries.

Soil ecotoxicological methods for determining effects of pesticides in the field may be adapted for application in tropical regions, but Mangala de Silva also demonstrated that we must be aware of the involvement of other organisms in ecosystem processes (*e.g.*, termites in addition to earthworm in decomposition) and of the possible influence of wet or dry conditions typical of the tropics.

Several lectures addressed the possible effect of chemicals on aquatic ecosystems and the difference in sensitivity of tropical versus temperate systems. In general, differences in exposure seem more relevant than differences in sensitivity according to Andreu Rico's presentation. But it also was demonstrated by Michiel Daam that tropical systems are confronted with seasonality and that the role of nutrients should be taken into account when assessing the effects of chemicals such as pesticides. Eduardo da Silva showed that a battery of bioassays may be adequate in assessing the possible risk of pesticides entering aquatic ecosystems by runoff.

Frank Wania showed that agricultural soils may be a source rather than a sink of organochlorine pesticides like DDT. In the extreme dry season typical of several subtropical African countries, such chemicals may be emitted by evaporation, especially from soils with low organic content.

The session had some 18 posters, addressing a diverse number of topics, ranging from pesticide levels in tropical environments, the development of new ecotoxicity test methods with tropical species of soil and water organisms, ecotoxicological risk assessment of chemicals under tropical conditions to human health effects in the tropics.

The majority of the presentations corroborate the evidence that traditional methods of doing ecotoxicology can be applied in the tropics with minor changes, either in soil or in water, but the use of local species in risk assessment is an important issue and can not be neglected.

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