



www.apc.eu.com

International reach through local focus

Monday, 24 May 2010

14:40-15:00 ET03-3 (Platform presentation)

Sala Bahía ET03 - Ecosystem vulnerability to stress factors

Resilience of aquatic communities: short- and long-term effects of insecticide exposure to a stream community

H Christl (Wetherby, United Kingdom)

The sensitivity and vulnerability of ecological systems is a key issue in ecotoxicology, but for small stream ecosystem the data base is small. This well documented case of effects on stream arthropods of an accidental exposure to an insecticide is considered to be useful in assessing which traits determine the vulnerability of similar ecosystems to stress.

A single pulsed dose of cypermethrin deprived the stream of its arthropod fauna from the point of contamination downstream. There were no major tributaries, but some springs and an unaffected section upstream of the point of discharge acted as reservoir. While the event was worst-case in terms of initial concentrations, it was not in terms of timing: most aquatic insect species had started emerging and thus parts of their populations - being in the terrestrial phase - were not exposed and could successfully recolonise the stream shortly after the event. Most populations recovered within a year and there were no clear connections between the incident and a small number of species that appeared to remain less abundant in the subsequent years. The findings are used to attempt a definition of key parameters that determine vulnerability and resilience of similar benthic communities in streams at species and habitat level. In this case the presence of uncontaminated terrestrial stages was the main mitigating factor.

Monday, 24 May 2010

08:00-18:30 (Poster)

Poster area ET03P - Ecosystem vulnerability to stress factors

Resilience of aquatic communities: effects of a major flood event on the nematode community of a small stream

H Christl (Wetherby, United Kingdom)

The sensitivity and vulnerability of ecological systems is a key issue in ecotoxicology, but for small stream ecosystems the data base is small, and even smaller for meiozoobenthos (in this case free-living nematodes) where the base line is mostly unknown. Benthic communities of smaller streams with sandy sediment appear to be constantly stressed; they never reach equilibrium but undergo cyclic phases, partly synchronized with seasons, and partly unpredictable stress incidents such as freezing, drought or atypical flood events.

The community of free-living stream nematodes was rich in species but only moderately diverse, as it was dominated by a few r-selected species. The flood event changed the community structure, and some dominant species declined by >90%. Diversity increased slightly at two sites but decreased significantly at the third. Community structure was significantly related to some sediment parameters, but the underlying reasons are not well understood. Moderate stress from natural factors appears to play an essential role in maintaining species richness and diversity of nematode communities in small streams, suggesting that – unlike groundwater fauna - they should also cope with some degree of anthropogenic stress. The findings



www.apc.eu.com

International reach through local focus

are used to attempt a definition of key parameters that determine vulnerability and resilience of similar meiobenthic communities in streams at species and habitat level.

Monday, 24 May 2010
17:45-18:10 MOPC2-4

Poster area MOPC2 - **Aquatic macrophytes ecotoxicology and risk assessment: state of the art**
Analysis of pesticide toxicity to aquatic macrophytes based on species sensitivity distributions

M Giddings ,S Loutseti ,G Arts ,I Barber ,N Cedergreen ,H Christl ,J Davies ,M Dobbs ,M Hanson ,U Hommen ,J Honegger ,R Sogaard ,G Weyman (Rochester Ma, United States of America)

A workgroup was formed at the AMRAP (Aquatic Macrophyte Risk Assessment for Pesticides) workshop, held by SETAC-Europe in January 2008, to address the use of Species Sensitivity Distributions (SSDs) for analysis of pesticide toxicity to aquatic vascular plants. Issues to be investigated include selection of endpoints for inclusion in SSDs, statistical methods for SSD analysis, the range of sensitivity within and between macrophyte species, and the sensitivity of Lemna species relative to other macrophytes. A database of macrophyte and algal toxicity endpoints for approximately 60 herbicides and fungicides was created as a starting point for the investigation. Each endpoint was examined and evaluated according to data quality criteria established specifically for this project. Additional data were compiled from public sources and from studies conducted by private companies to support pesticide registration. Current SSD methodology was reviewed for applicability to the macrophyte toxicity database and the project objectives. Issues considered in the methodology review included endpoint selection, SSD calculation, and handling of "greater-than" and "less-than" endpoint values. Based on the review, a protocol was developed for application to the macrophyte toxicity database. The SSD analysis was used to compare the sensitivity of Lemna with other macrophyte species and with algae, to compare results among herbicides and fungicides with different modes of action, and to compare sensitivity among taxonomic groups (monocot, dicot) and growth habits (submerged, floating, emergent). The findings of this investigation will be useful for establishing priorities for testing, developing test methods, and interpreting macrophyte toxicity data in pesticide risk assessments.