S2 (0.03-0.16 mm), and one dissolved fraction (<10 kDa) from agricultural runoff material. Interactions of propiconazole with the two size fractions (S1 and S2) have been studied by estimating sorption- and desorption coefficients (Kd-values). After exposure *Ceratophyllum demersum* to water suspensions of different size fractions with and without propiconazole, the photosynthetic activity, pigment pattern and activity of a detoxifying enzyme were determined. These physiological parameters are used to evaluate the effects of different runoff components on water plants.

**TUP04/002**

**Application of a bioassay battery for the assessment of ecotoxic loads in a small running water (Nette, North Rhine-Westphalia, Germany)**

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Small running streams in densely populated regions often contain high ecotoxic loads. The EU Water Framework Directive (2000) requires suitable methods to assess and evaluate anthropogenic stress in rivers as a base of a "deficit analysis" prescribed in the law. The aim of the presented project is to create a test battery for this challenge.

The lowland river Nette is a tributary of the river Niers (D) and belongs to the catchment area of the river Maas (NL). The Nette catchment area (165 km²) is situated in the international natural preserve area Maas-Schelw-Nette. In the summer the headwater of the stream Nette consists up to 90 percent of effluents dumped by municipal sewage plants. Preliminary investigations showed that these effluents are strongly characterized by chemical compounds which originate from textile industry and agricultural use.

Both water and sediment samples were tested since the start of the project in spring 2002. The water phase was investigated with a *Daphnia* population test, a duckweed growth inhibition test (*Lemna minor*) and a test with fish eggs (*Danio rerio*). The river sediments were assayed with a bacteria test (*Arthrobacter globiformis*), a chironomid toxicity test (*Chironomus riparius*) and with a nematode growth and reproduction test (*Caenorhabditis elegans*). Supplementary a test to screen possible genotoxic effects, the umu-Test, was applied. The suitability of the different biotests will be discussed and an integrative assessment tool for the results of all biotests will be presented.

**TUP04/003**

**A novel approach to identify multiple stressors to *Psedorasbora parva* by AFLP analysis**

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Most of criteria for chemical compounds in aquatic ecosystem are based on their acute toxicity. But it will be more important to evaluate the effects of long-term, low-level chronic exposure of populations by multiple stressors and to identify causative stressors among multiple stressors for the conserving or restoring many populations in aquatic ecosystem.

This study presents a novel approach to identify multiple stressors to *Psedorasbora parva* by AFLP analysis. AFLP analysis is a very useful technique to reveal genetic diversity in natural populations with a little quantity of each sample (therefore, we don't have to sacrifice fish.). Genetic studies have been conducted on a few species of vertebrates exposed to environmental pollution and demonstrated genetic damage by chronic chemical exposures. We consider the possibility to reveal causative stressors by fingerprints of amplified fragment length polymorphism of individual fish. We apply AFLP analysis to *Psedorasbora parva*, which can live in various river and lakes, even contaminated ones in Japan.

At first, we reveal the conditions and reproducibility of AFLP analysis to three organs in *Psedorasbora parva* to select best organs for analysis and stressors identification. Thereafter, we apply AFLP analysis to *Psedorasbora parva* which were captured in some special rivers and lakes which are considered to be contaminated mainly only by wastewater from factories, sewage treatment plant or agricultural effluent. We also analyze chemical contamination level of the sampling sites, for example PAHs and heavy metals. From these data about chemical compounds and AFLP analysis, we classify amplified fragment length patterns into several groups based on contamination source properties.

**TUP04/004**

**Relationships of characterization of benthic macro-invertebrate communities and hydraulic factors in small-scale habitats**

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Benthic macro-invertebrates were collected in a 200 m reach located in the 3rd order Yangjae Stream, a tributary of the Han River, Seoul, Korea. Although species richness was relatively low due to organic pollution, community abundance patterns appeared to be different depending upon location of the sampling sites. At the sample sites in the straight zone with high water velocity and large substrates, species richness was higher and species less-tolerant to organic pollution was additionally present. At the sample sites in the pool zone with lower velocity and high sedimentation, species richness was lower and a few tolerant species to organic pollution were abundantly collected. CCA (Canonical Correspondence Analysis) indicated that some sample sites in the straight zone were characterized with appeared to be related to water velocity and shear velocity, and appeared to be associated to diverse taxa less tolerant to organic pollution. The sample sites located at the pool zone tended to be associated with sedimented organic matter and the taxa tolerant to organic pollution, Oligochaeta and *Chironomus* sp., etc.

**TUP04/005**

**Modulation of bioconcentration of pyrene by dissolved organic matter (DOM) and piperonyl butoxide in *daphnia magna***

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Aquatic invertebrates are frequently used in ecotoxicological studies. Yet, the capability of invertebrates to metabolize different xenobiotics is not very well known. Furthermore, knowledge on the possible effects of natural substances (e.g. DOM) on physiology of aquatic organisms is quite limited. The purpose of this study was to 1) determine the ability of *Daphnia magna* to metabolize pyrene, 2) to verify if P450 monooxygenases were involved in the biotransformation, 3) compare the bioavailability and biotransformation of pyrene in artificial freshwater and natural a lake water with high DOM content. The biotransformation of pyrene was shown to be extensive. Piperonyl butoxide inhibited the biotransformation, which indicated the involvement of P450 monooxygenases. The uptake of pyrene was lower in the natural lake water than in the artificial media when total amount of pyrene (parent + metabolites) was quantified. However, when considering the parent compound only, the body burden was found to be the same in the both exposure waters.

**TUP04/006**

**Optical barriers: an effective tool to minimize stress induced by dominant rainbow trout in ecotoxicological testing?**

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Rainbow trout (*Oncorhynchus mykiss*) is a recommended and commonly used species for ecotoxicological acute and chronic testing required in the workshop.