

rainfall regime. Both methodologies exhibited similar results, however, in the case of SOM, complex patterns and relationships among input variables could be extracted clearly (e.g. gradient of peak values on two-dimensional layer). This study indicated SOM application to river ecological data is reliable as a sophisticated multivariate analyzing tool.

**B428** The change of toxin production of cyanobacteria affected by feeders, zooplankton and fish

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The change of blue-green algal toxin production in response to the feeding activity was examined using four strains of *Microcystis aeruginosa* that two strains was non-toxic (NIES No. 44 and 99), others was toxic strain (NIES No. 87 and 88). Direct (with zooplankton) and indirect (zooplankton filtered water) effect on feeder were tested with *Moina macrocopa*, *Daphnia magna* and *D. pulux*. Direct effect of *Hypophthalmichthys molitrix* and *Carassius gibelio langsdorfi* was also examined. In the direct and indirect experiment, highest total microcystin of non-toxic strains (No. 44 and 99 was 2.7 and 12.8 mgg-1-dry cell on the control) were detected in all three zooplankton treatments at 3rd day (Toxin of No.44 and 99 was 79.8 and 95.4 mgg-1-dry cell on *D. magna*). Until the end of experiment, the toxin level was decreased or maintained at high level. In the treatment of *H. molitrix*, total microcystin concentration of non-toxic strains were certainly increased about 2 (No. 99, 51.1 mgg-1-dry cell) and 16 times (No. 44, 853.8 mgg-1-dry cell) at 6th day. Microcystin concentration of No. 88 was increased from 3,980.5 to 5,145.0 mgg-1-dry cell. Microcystin content was also increased

in the *C. gibelio langsdorfi* treatment. These results suggested that microcystin production was not only affected by grazing of zooplankton and filter feeding of fish but also filtered water of zooplankton culture media.

**B429** The evaluation of fish migration and population size in a small stream using the fluorescent elastomer

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The evaluation of fish migration and population size in a small stream (Cheolma Stream) was investigated 9 times from July to September 2001. The tagging system for this experiment was the Visible Implant Fluorescent Elastomer (VIE) hand injection kit (Northwest Marine Technology<sup>®</sup>). This liquid material is implanted and than transformed into a soft solid. After tagging, fish mortality was not affected by this method. Preopercles of 10 species (a total of 288 individuals) were marked and released at the sampling site. In the previous studies, tagging systems were frequently used to large size fishes (Salmoidae). In case of small size fish (< 40 mm of standard length), VIE was injected into the skin of dorsal body. The VIE was injected in the back skin of pectoral fin of carnivorous fish like *Coreoperca herzi* and *Odontobutis platycephala*. We detected VIE in the recaptured fishes (recapture rate: ~ 2.4%) under U.V. light. This method was useful to evaluate freshwater fish population size and fish migration in Korean streams where weirs are common.

**B430** Morphological changes of *Microcystis aeruginosa* and *Scenedesmus dimorphus* induced by infochemicals released from zooplankton grazers

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Grazer-induced colony formation was examined using two strains of blue-green alga *Microcystis aeruginosa* Kutzing and green alga *Scenedesmus dimorphus* (Turpin) Kutzing. Each alga was cultured in a medium with or without filtered water in which *Daphnia magna* or *Moina macrocopa* had been reared. Colony formation was obviously promoted in both *Scenedesmus* and *Microcystis* by exposure to zooplankton filtered water (ZFW), although the colony formation of *Microcystis* was weakly influenced by ZFW rather than that of *Scenedesmus*. The particle volume as well as the number of cells per one colony of both *Scenedesmus* and *Microcystis* increased between 24 and 48 hours after exposure to ZFW, which were caused by an infochemical released from *Daphnia* or *Moina* probably as a part of defense mechanism against zooplankton grazing.

#### **B431** Fish fauna survey and fish capture using different mesh size of gill net in two different habitats of the tropical Perak River, Malaysia

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Perak River is the 2nd largest river system in the Peninsular Malaysia with 15,151 km<sup>2</sup> of catchment area. The river flows into the Malacca Sea. Within this basin, annual precipitation varies from 1,500 mm to 3,600 mm. We surveyed fish fauna at two different sites of the river in Sept. 2001. One is the largest riverine reservoir, Temenggor that was located in upper part

of the river, and the other is the estuarine part of the river, Teluk Intan. Twelve species with 136 individuals (6 families) were collected and Cyprinidae *Mystacoleucus marginatus* dominated (relative abundance, 35.3%) in Temenggor Reservoir. Cyprinidae (86.0%) was dominant family. 155 individuals of 14 family 17 species were collected and *Parambassis apogonoides* (Chandidae) was dominant (21.3%) in Teluk Intan. Arridae (29.7%) was dominant family. On using mesh size 5 cm of gill net, collected species and individuals (20 species with 117 individuals) were higher than others (total 5 mesh size classes; 3 times of collection). Highest capture of fish occurred from 18:00 to 02:00 (19 species with 159 individuals).

#### **B432** Seasonal Changes of the Phytoplankton Community in the Imjin River

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Seasonal changes of the phytoplankton community structure was investigated from July 2000 to April 2001 at five stations in the Imjin River. The phytoplankton standing crops varied from 89,431 cells/ℓ at station 1 in October 2000 to 8,825,050 cells/ℓ at station 3 in April 2001. There was a bimodal pattern showing maximum of phytoplankton standing crops on April and July-October at the all investigated stations except for the station 1 in October 2000 and January 2001. The major dominant species were *Achnanthes minutissima*, *Anabaena* sp., *Aulacoseira ambigua*, *A. granulata*, *A. graunulata* v. *angustissima*, *Cylindrotheca closterium*, *Cymbella affinis*, *Diatoma vulgare*, *Merismopedia elegans*, *Stephanodiscus hantzschii* f. *tenuis*, and especially *Aulacoseira* sp. and *Stephanodiscus* sp. were major dominant species at the all investigated stations except for the station 1.