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The Changes of Physico-chemical Factors during the Vacuum Suction Dredging Operation in a Small Reservoir

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Sediment with high nutrient concentration often cause harmful algal blooms in reservoirs for agricultural water supply. During the sediment removal, the secondary problems such as suspended solids (SS) generation and diffusion by dredging operation have been reported. In order to evaluate the changes of physico-chemical factors (dissolved oxygen, electric conductivity, salinity, pH and turbidity (NTU) and Chl. a) during the dredging of sediment using a vacuum suction system, a small agricultural reservoir (60~80 cm of sediment core length and 6m of maximum depth) was selected and partially dredged (3m x 3m and 60cm depth). There was no significant change on other factors except turbidity. Turbidity at each depth(m) within 10meters of horizontal distance from the operation area was stable as 1 1~12 NTU before the dredging. A rapid generation of SS was observed within 15minutes of the dredging operation and horizontal mean turbidity reached 22~28 NTU. Turbidity showed maximum peaks at 5 meters and ranged from 32~42 NTU. Turbidity was reduced within 20 minutes after the completion of dredging. After one hour, turbidity of water column was stabilized to 13~15 NTU. Dredging of sediment using the vacuum suction type may be a good option for reducing disturbance caused by excessive suspended materials. This study was supported by the Ministry of Agriculture and Forestry, Korea (ARPC grant no. 302006-03-1-HD130).

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Influencing Parameters of the Zooplankton Community Dynamics in the Major Tributary of the Nakdong River: Pattern Cognition Using Non-linear Model (Self-organizing Map) (1998-2002)

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In this study the zooplankton community dynamics were modelled by means of a non-linear algorithm of Self-Organizing Map (SOM). The study site, Keum-Ho River, is a good example of the urbanized freshwater ecosystem in the Nakdong River (S. Korea). The ecological structure of zooplankton in this system might be affected by the anthropogenic factors. The importance of zooplankton community in this river was revealed that it is responsible for the temporal changes of zooplankton community in the middle part of the Nakdong River. Therefore knowing the patterns of this zooplankton community structure can suggest information about the limnological dynamics of main channels in the middle part of the river. The five years' number of zooplankton individuals was used (1998 to 2002), and the model was trained in unsupervised fashion. The model could cluster zooplankton community seasonally well. From the sensitivity analysis, among the various limnological parameters, river discharge was mainly responsible for the zooplankton community dynamics. This study could suggest not only the SOM applicability to the freshwater zooplankton community dynamics but also the elucidation of ecological mechanisms on the river zooplankton.

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사연댐 식물플랑크톤 현존량(세포수와 체적)의 계절적 수직분포 비교

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상수원 전용으로 사용되는 사연댐에서 식물플랑크톤의 수직분포에 따른 종조성과 현존량의 변화양상을 규명하기위해 1999년 5월부터 2001년 10월까지 매월 1회씩 수심 2 m간격으로 총 28회 채수하여 분석하였다. 조사기간 중 출현한 식물플랑크톤은 7강, 15목, 36과, 96속, 222종, 35변종, 7품종으로 총 264분류군이 출현하였다. 분류군의 수가 가장 적게 출현한 시기는 2001년 1월의 49분류군이었으며, 가장 많이 출현한 시기는 110분류군이 출현한 2001년 11월이었다.시기별 세포수현존량이 최대를 보였던 시기는 2001년 7월의 148,490 cells/mℓ(11,161,911 μm³/mℓ로 남조류의 bloom이 있었으며, 세포체적으로 환산시 최대 현존량은 세포체적이 큰 Synedra spp. (2,350 cells/mℓ)이 우점하였던 2000년 5월 12일의 11,356,009 μm³/mℓ (5,131 cells/mℓ)로 나타나 현존량 산정시 세포수와 체적간에는 많은 차이가 있었다. 또한 전 수심에 걸쳐 세포수와 체적과의 상관도는 남조류의 비율이 높은 표층 (r=0.58)과 중층(10m: r=0.18)보다 규조류의 비율이 높은 저층(24 m: r=0.90, 28 m: r=0.98)에서 높게 나타났다. 수위가 낮고 유출량이 적었던 2000년(5~10월)과 수위가 높고 유출량이 많았던 1999년과 2001년의 7~9월에는 남조류가 우점하였으며, 그 외 전 기간동안 규조류가 우점하는 경향을 보였다. 또한 하절기 (5~9월)의 수직분포는 2000년도가 1999년도와 20001년도 보다 저층에 더 높은 현존량을 보였으며 남조류가 하향 분포하는 경향을 보였다.

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Community Changes in Benthic Macro-invertebrates and Impact of River Improvement Techniques in the Yangjae Stream, Han River

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As a background research for the "close-to-nature" restoration project conducted on urbanized streams in Korea, the field survey on benthic macro-invertebrates was monthly carried out on the sample sites in 10 20 m distance at a 200 m reach (Hakyeoul) in the 3rd order Yangjae Stream, a tributary of the Han River, Seoul, from April 1996 to March 2000. The Yangjae Stream was polluted with organic matter in mid nineties and has been being slightly recovered recently. Although the number of taxa collected at the survey area was in general low,community abundance appeared to be characterized by the small-scale environmental conditions of the habitats. At the sample sites located in the upper-straight area, where water velocity was high and larger substrates occurred, the number of taxa was correspondingly higher and species indicating partial recovery of water quality were more frequently collected. Especially at the sample sites where large substrates were artificially planted at the stream bed close to the riparian zone as a river improvement technique, diverse species were collected including the indicator species for partial recovery of water quality including Baetissp. in Baetidae, and Orthocladius sp., Cricotopus sp. and Tanypus sp. in Chironomidae. In contrast, at the sample sites locatedat the pool zone, where water velocity was low and higher levels of sedimentation occurred, a few tolerant species to organic pollution were abundantly collected: Oligochaeta was mostly dominant, being followed by Chironomus sp..