

multivariate statistics (factor analysis, FA) and artificial intelligence (Artificial Neural Networks, ANNs) was implemented for predicting the dynamics of phytoplankton biomass in the lower Nakdong River. The data of general limnology were collected from 1994 to 1998, and monthly average of each parameter was used. The lower part of the river was hypertrophic (5 years' average: NO_3^- -N, 2.7 mg/L; NH_4^+ -N, 0.6 mg/L; PO_4^{3-} -P, 34.7 mg/L; chlorophyll a, 50.2 mg/L) and phytoplankton biomass was largely affected by the flow regulation. FA categorized three factors from the data of meteorological, hydrological, physico-chemical: meteorological impact on nitrate dynamics, nutrient loading by hydrological changes, underwater light condition. Those factors could explain 80% of the limnology of the river. After training of ANN with four years' data (1994-1995, 1997-1998) of the three factors, this network was tested on 1996' s data for recognition of the changes of chlorophyll a concentration. The network fitted well ($r^2=0.95$). The sensitivity analysis of the trained network showed the factor 'hydrological regime related to the nutrient loading' was the most influencing among those factors. This result has an importance as the first attempt of combining FA and ANN to predict as well as elucidate the interested phenomenon. Also it indicates that 1) the combination of FA and ANN can explain the static and dynamic influences of the causality of eutrophication; 2) the changes of phytoplankton biomass in river-reservoir hybrid system is driven by the hydrological regime with the dynamics of loaded nutrients.

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호소의 방류수에 포함된 P 함량의 계절변동

장봉호, 김용운, 이호영, 이순자¹, 신재기²
한국수자원공사 대청댐관리단, 한국수자원공사

수자원연구소¹, 인제대학교 환경시스템학부²

호소에서 수중영양염의 증감에 영향을 줄 수 있는 요인은 다양하게 존재한다. 그 중 하계에 집중강우가 있을 후 수량이 급증하고 수온 상승과 맞물려 수심이 증가함에 따라 중저층 탁수(turbid water) 밀도류가 하류로 갈수록 더욱 선명하였다. 따라서 이러한 탁수현상이 상부 수층에 미칠 수 있는 영향과 저질환경의 관련성을 파악하고자 하였다. 대청호의 방류수를 2000년 4월부터 10월까지 수문, 수온, 탁도, NH_4 및 SRP 등 각종 환경요인을 1주 간격으로 조사하였다. 방류수 탁도는 8.0-80.2 NTU 범위로서 7월 하순에 최대값을 보였고 NH_4 와 SRP는 각각 0-70 mg N/l, 0-36 mg P/l 범위로서 9월 중순에 가장 높아 계절적 특성이 뚜렷하였다. 반면, 호소의 표층수는 P 영양염이 고갈된 상태였다. 또한 탁도와 무기영양염이 최대를 보인 시기가 상당한 차이가 있음이 관찰되었고 특히 방류수에서 N, P 영양염의 증가는 외부로부터 유입되는 영향으로 볼 수도 있으나 내부오염원의 영향도 큰 것으로 추정되었다. 따라서 하계에 탁수의 방류는 호소 내부의 수질오염 부하를 저감시키는 중요한 부분으로 볼 수 있었고 향후 이에 대한 구체적인 후속 연구를 통해 정량화가 필요한 것으로 판단되었다.

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Phytoplankton community dynamics of large river system in S. Korea

Jung-Gon Kim, Min-Ho Jang, Sung-Bae Park, Gea-Jae Joo

Dept. of Biology, College of Natural Science, Pusan National University, Pusan, S. Korea 609-735

Phytoplankton community and other basic water quality were conducted in large river systems in S. Korea from July 1999 to June 2000. The total of 222 taxa (7 class) were identified from 22 sites and three seasonal sampling programs. Dominant class was Chlorophyceae (57.4%) and others classes were as followed, Bacillariophyceae (26.8%), Cyanophyceae (13.8%) and Euglenophyceae

(1.4%). Furthermore dominant species was *Tetraspora gelatinosa* (53.4%) and subdominant species were *Microcystis incerta* (13.4%), *Stephanodiscus hatschii* (8.1%), *Synedra acus* (1.9%), *Nitzschia palea* (1.8%) and *Cyclotella comta* (1.5%). Species diversity was highest at Nakdong River (147 species) and Chlorophyll *a* was Youngsan River (mean 35.1 \pm SD 43.2). Nutrients reveal (TN, 0.11 ~ 17.3 mg/l; TP, 39.5~702.7 mg/l), temperature (1.2~32.6°C) and water retention time (3~1,207 CMS) during the study period seems to be important factors for the phytoplankton community composition and biomass.

B501

**Effects of Insecticide on
Decomposition of Mushroom, *Russula
bella***

**Namgung Jeong^{*}, Nam-Ki Park,
Chang-Seok Choi, Ji-Yeon Kim and
Hyeong-Tae Mun**
Dept. of Biology, Kongju National University,
Kongju, 314-701

Mass loss and nutrient dynamics were analyzed during the decomposition of mushroom, *Russula bella*, for 13 days from July 25 to August 6, 2000 on the oak forest in Kongju, Korea. We used litter bag method. Half of the litter bags were treated with the insecticide (treatment) to eliminate microarthropods. After 13 days, remaining mass of the control and the treatment was 4.9% and 29.8%, respectively. The rate of weight loss of the control was significantly higher than that of the treatment after 3 days. Initial concentration of N, P, K, Ca and Mg of the *R. bella* was 28.1 mg/g, 0.82 mg/g, 14.5 mg/g, 0.53 mg/g, 0.33 mg/g, respectively. Remaining N and P of the control and the treatment was 5.5 and 41.7% for nitrogen, 3.8 and 34.9%, respectively. Remaining K, Ca and Mg of the control and the treatment was

0.8 and 7.2% for K, 77.1 and 306.8% for Ca, 7.4 and 51.8% for Mg, respectively. Potassium contents in *Russula bella* was much greater than those of Ca and Mg. Except for Ca, there was no immobilization period in all nutrients during decomposition. Lower mass loss rate in treatment indicate that microarthropods play a significant role in mushroom decomposition in temperate oak forest.

B502

**Mass Loss and Changes of Nutrient
during Decomposition of *Zizania
latifolia***

**Jeong-Hee Kim^{*}, Jeong Namgung,
Chang-Hwan Shin and Hyeong-Tae Mun**
Dept. of Biology, Kongju National University,
Kongju, 314-701

Mass loss and changes of mineral nutrient during the decomposition of macrohydrophytes, *Zizania latifolia*, were investigated for one year from November in 1998 to November in 1999 in Boryeong, Korea. Plant materials which are collected on September 1998, are divided into leaves, stems and rhizomes, and used for litter bag preparation. After 13 months, remaining mass of leaves, stems and rhizomes was 16.9%, 14.7%, 10.1%, respectively. The rate of weight loss of the rhizomes was significantly higher than those of the leaves and stems. Initial concentration of nitrogen, phosphorus, potassium, calcium and magnesium of leaves, stems and rhizomes was 18.0, 14.5, 44.0 mg/g for N, 0.18, 0.12, 0.67 mg/g for P, 14.1, 14.2, 14.8 mg/g for K, 3.60, 1.47, 0.30 mg/g for Ca and 1.07, 0.48, 0.53 mg/g for Mg, respectively. In general, concentrations of nutrients were higher in rhizomes than in leaves and culms. Except for Mg in rhizomes, there was no immobilization period during the decomposition.