C. 육수학

C301

상수원 주변 난개발 방지 방안

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'94년 준농림지역 개발허용으로 상수원 주변에 음식점숙박시설 공동주택이 증가하여 '97년 준농림지역 규제강화, '99년 수변구역지정, '00년 팔당상수원수질특별대책지역고시 개정등을 통하여 건축물 입지를 제한하고 있다. 그러나 복잡한 토지이용계획에 관한 법령 등의 문제점과 개발대상지에 대한 개발계획이나 지침이 없어 소규모 산발적 개발로 환경오염 및 경관훼손이 초래되고 있는 실정이다. 특히 고시시행 이후 전원주택으로서의 입지가 양호한 지역에서는 개별적 개발이 지속되고 있어 대책마련이 필요한 실정이다. 그간 사전환경성검토 및 자연환경훼손방지를 위한 경관보호제도 도입 등으로 난개발 추세는 크게 둔화되었으나 전원주택 건축은 계속되고 있다. 이들 무계획적 전원주택 개발을 방지하기 위해서는 환경친화적 지역개발 계획수립 및 오염총량관리제도 조기시행을 통한 친환경적 개발을 유도할 필요가 있다. 또한 산지 난개발 방지를 위해 산림이 우수한 지역은 개발을 제한하고 나대지로 방치되어 있는 토지는 협의 매수하여 녹지를 조성하는 등의 방안이 필요하다고 본다. 그리고 각종 인허가 사업에 대한 사후 관리 강화 및 상수원보호구역, 수변구역, 특별대책지역에 대한 오염원 입지를 지속적으로 제한하는 규정 마련이 필요하다고 사료된다.

C302

Classification of Korean Agricultural Reservoirs Based on Chlorophyll-*a* and Morpho-physical Characteristics

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The present study was conducted to classify Korean agricultural reservoirs with chlorophyll a concentration and morpho-physical parameters, and to evaluate trophic states and water quality characteristics of the classified types. The collected a data from 403 reservoirs were classified as four types, with the Chl. *a* concentration (25㎍/l) and water storage/surface area (WS/SA, 5m). According to trophic state index, 53% of selected reservoirs appeared to be eutrophic. Twenty four percent of reservoirs was classified as type I (Chl. *a*<25㎍/l, WS/SA<5m), and 55.1% as type IV type (chl. *a*<25㎍/l, WS/SA>5m). Among the reservoirs in Type I (Chl.*a*<25㎍/l) and II (Chl.*a*=25㎍/l) in which WS/SA ratio was 5m, 90% showed Chl.*a* concentration = 25㎍/l, in Type III (Chl.*a*=25㎍/l) and IV (Chl.*a*<25㎍/l), only 9% was the Chl.*a* concentration =25㎍/l. BOD, COD, SS, TN and TP concentration of type II (chl. *a*>25㎍/l, WS/SA<5m) were higher than those of other types, while its the drainage area/surface area (DA/SA) ratio was relatively lower. The significant relationship Chl.*a* and water quality parameters was observed in the reservoirs where Chl.*a* concentration was = 25 ㎍/l. Chl.*a* concentration was significantly correlated with TP and COD concentration in reservoirs included in Type II, and with BOD, SS, and TN concentration in Type III. Although drainage area is believed to be a factor that is related to the production load of pollutants in the watershed, it did not show any significant relationship with water quality parameters. This study was supported by the Ministry of Agriculture and Forestry, Korea (ARPC grant no. 302006-03-1-SB010).

C303

The Effect of Limiting Nutrients and Stoichiometry on Phytoplankton Growth in a Small Agricultural Reservoir (Singu Reservoir)

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This study was conducted to evaluate the effect of limiting nutrients and N/P ratio (by mass) on the growth of phytoplankton from November 2002 to March 2003 in a small agricultural reservoir. DIN/DIP and TN/TP ratio of the reservoir during the study period was 118-1,713 and 15-30, respectively. Most of nitrogen concentration in the reservoir was NO3-N, but sharp increase of ammonia was evident during snow melting season and thermal stratification period. Dissolved inorganic phosphorus, in the other hand, did not show much fluctuation. Major phytoplankton structure showed the shift from cyanophytes (e.g. *Microcystis aeruginosa, Oscillatoria* spp., and *Aphanizomenon* sp.) during November and December to bacillariophytes (e.g. *Aulacoseria varians*, A. *ambigua*) and chlorophytes (e.g. *Monoraphidium contortum, Senedesmus* spp.) during spring. Laboratory batch culture experiment showed phytoplankton were limited by P, in concert with relatively high N/P ratio in the reservoir. The decrease of phosphorus concentration, thus the increasing of N/P ratio, cleary induced decrease of the growth rate. There was no substantial changes in the growth rate in the N/P ratio of 0.7-10 when the nitrogen concentration was 0.7 ㎎/l but showed broader range than that in nitrogen concentration of 3.5 ㎎/ l. Thus, the higher nitrogen concentration in the water induced the stronger P-limitation on the phytoplankton growth. These results indicate that a limiting factor and the optimal stiochiometry range on phytoplankton growth can be variable even in the same N/P ratio when the N or P concentration is different. This study was supported by the Ministry of Agriculture and Forestry, Korea (ARPC grant no. 302006-03-1-SB010).

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Short-term Nutrient Enrichment Bioassay as a Diagnostic Tool Identifying Primary Factor Regulating Phytoplankton Productivity in Various Lentic Ecosystems

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Nutrient Enrichment Bioassays (NEBs) were conducted in eight lentic ecosystems during April 2002 ~ March 2003 to identify primary limiting nutrient regulating phytoplankton productivity and determine uptake effects of various nutrients over the incubation period of the NEBs. Algal response in the NEBs indicated that six waterbodies were limited by phosphorus, one was limited by light, and another one was not evident due to low initial chlorophyll concentration (0.52 g L-1). Diel pH peaked in the P-treatment on day 5 after the incubation and the peak was coincided with CHLf : CHLi ratios of the P-treatments. Active phytoplankton growth, based on the ratios of CHLf: CHLi, occurred when TN:TP ratios were < 50 and pH was > 9.5. Initial ambient P-level was maintained in the control and nitrate-N treatments, but declined linearly at a rate of 14.8 g L-1 per day (R2 = 0.997, p< 0.05) in the P-treatments. Relations between CHL:TP ratios and the incubation period indicated that growth of algal cells did not occur during day 1-2, but started to occur after day 3. In the mean time, nitrate-N uptake was evident in the P-treatments, but not in the control, nitrate-N and ammonia-N treatments, indicating that single nitrogen input from the watershed may not stimulate phytoplankton growth. This approach employing NEBs may provide an efficient management strategy to control the eutrophication in these systems.