

## Phosphorus Cycling among Plankton and Periphyton in Nearshore and Littoral Regions of a Shallow Subtropical Lake.

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Phosphorus (P) uptake and release by plankton and periphyton were studied in the pelagic-littoral interface region and in the interior littoral zone of a shallow subtropical lake. Studies were conducted using <sup>32</sup>P-labeled inorganic(DIP) and organic phosphorus (DOP), and components of the natural community assayed under laboratory conditions simulating ambient temperature and irradiance. At study sites located in the ecotone region, P dynamics varied seasonally with changes in underwater irradiance and bioavailable P (BAP) concentration. During winter-spring, irradiance and community P uptake and release rates were very low, and water column BAP was high. In summer-fall, irradiance was higher and there was rapid uptake of both PO<sub>4</sub> and DOP, primarily by the phytoplankton. In the P-deficient littoral zone, underwater irradiance always was high, BAP was low, and there was active uptake of PO<sub>4</sub> and DOP by both plankton and periphyton year-round. The largest pool of P occurred in the epipelon, but most rapid uptake was by bacterioplankton. In this study we also observed adaptations to P deficiency at the community-level, which previously were reported only for particular assemblages (e.g., plankton and periphyton). There was an increased use of DOP relative to PO<sub>4</sub> as BAP declined, and a decreased ratio of P release/uptake, suggesting a greater internal cycling of the limiting resource.

## Exergy와 Emergy를 이용한 낙동강 생태계의 건강성 평가

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본 연구에서는 이론 생태학의 새로운 개념인 엑서지(Exergy) 및 에머지(Emergy)에 대하여 그 정의(definition) 및 생태학적 적용방안 등에 대하여 살펴보고자 하며, 그 중 수생태계의 생태학적 건강성(ecosystem health)을 물금지점의 수질 자료를 이용하여 평가하고자 한다. 열역학적 4법칙(잠정적)으로 언급되는 엑서지 개념은 최근 열역학분야, 물리학 분야, 건물 냉난방분야, 에너지분야까지 적용되고 있으며 Jorgensen교수에 의하여 생태계분야까지 적용가능하게 되었다. Emergy개념은 Odum교수에 의해 창안된 goal function으로 생태공학분야, 생태학분야, 지속가능한 성장의 판단근거등으로 활발히 이용되고 있는 개념들이다. 따라서 본 연구에서는 엑서지 및 에머지 개념 및 Emergy/exergy 비를 이용하여 실제 낙동강 물금지점의 수질자료를 이용, 그 수생태계의 건강성을 평가하였다.