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Relation between nutrients and algal biomass in the intake tower in Taechung Reservoir

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Surface water samples were collected once per week in the intake tower, Taechung Reservoir during July 1993 to July 1994. The physical(water temperature, pH, dissolved oxygen, conductivity, turbidity), chemical (total nitrogen, total phosphorus) and biological(chlorophyll-a) parameters were measured to elucidate the relation between nutrients and algal biomass. The increase or decrease in concentration of dissolved oxygen has the reverse relations to the increase or decrease of water temperature. The concentrations of total nitrogen and total phosphorus in lake-water were remarkably increased by summer(July to August) intensive rain. pH was greatly increased in the periods which algal biomass was high. Conductivity was remarkably decreased by summer intensive rain, and recovered as the precipitation decreases. High turbidity was caused not by inorganic suspended solids but by organic suspended solids. This means most turbidity is biogenic turbidity. Water transparency by Secchi depth has closely reverse relation to turbidity increase. Algal biomass measured as chlorophyll-a increased when total phosphorus increased whe reas algal biomass did not increase by increase of total nitrgen. According to the total nitrogen : total phosphorus (TN:TP)ratio, the algal growth in the sampling site is limited by phosphorus concentration. Phosphorus should be controlled to improve the water quality in the intake tower, Taechung Reservoir.

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Determination of Appropriate Water Sampling Frequency for Effective Water Quality Monitoring in the Large Artificial Reservoirs

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Appropriate water sampling frequency in Taechung Reservoir was determined for monitoring of water quality. Most important factor regulating temporal variation of water quality was summer monsoon effect. Dissolved oxygen and pH increased in the premonsoon whereas two parameters were remarkably decreased during intensive monsoon period. Concentrations of total suspended solids were low in the premonsoon monsoon, but during monsoon, total suspended solids were greatly increased. High concentration of total suspended solids was not increased by non-volatile suspended solids but by volatile suspended solids. Secchi depth during summer monsoon dramatically decreased when turbidity and total suspended solids were the highest values. The nutrients such as total nitrogen and total phosphorus also highly increased during summer monsoon. Chlorophyll-a concentration as biological measurement was maximum peak during monsoon. According to trophic classification system (OECD, 1982), the different sampling frequency for monitoring of chlorophyll-a made the difference of trophic state. For these reasons of summer monsoon, the measurements of water temperature, pH, nitrate, ammonia, and dissolved phosphorus are needed minimum once a month. The measurements of dissolved oxygen, suspended solids, turbidity, secchi depth, total nitrogen, and total phosphorus are needed minimum twice a month. The measurement of chlorophyll-a are needed minimum four times a month to find the peak of algal biomass.