What drives the plant distribution in the riparian zone of the Three Gorges Reservoir, China

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Reservoir s have always played an indispensable role in human development all over the world. The operation of the reservoir water level has greatly changed the ecological environment pattern and material circulation process in the basin. Deep understanding the ecological and environmental effects of reservoir operation has become a hot issue. Three Gorges reservoir is one of the largest and most functional water conservancy project in the world. The reversal of flooding time and prolonged submergence have dramatically altered the hydrological regime and resulted in various ecological consequences, e.g., loss of previous vegetation and soil erosion in the water level fluctuation zone. According to some field survey reports: 550 species of 358 genera and 120 families were directly submerged after 175m of water storage; plants below 145 m were permanently submerged and all died; there are more than 200 species of plants in the water-level fluctuating zone, which is more than 60% less than before the submergence. The dominant plant species in the fluctuating zone of Three Gorges Reservoir is the perennial plant Cynodon dactylon, which can resistance to flooding over 200 days. We analyzed the relationships between plant biomass and environmental factors. Results showed that plant biomass is positively correlated with soil total nitrogen and flooding duration, and negatively correlated with elevation. Our research will provide effective support for the water quality and safety of reservoirs, and for the sustainability of ecological civilization construction in watersheds of our country.