

都市滯洪池人工浮島適用經濟作物之初探

A Pilot Study on Economic Crop Selection for Artificial Floating Islands in Urban Retention Ponds

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摘要

人工浮島 (Floating Treatment Wetlands, FTWs) 是一種易架設的生態工程設施，透過在漂浮的載體上種植水耕植物，達到水質改善目標。淨化機制包含植物根系深入水中吸收氮 (N)、磷 (P) 等水中營養物質、移除水中懸浮固體 (SS)，以及水下附生微生物降解有機物等。FTW 可應用於現存水域並具備適應水位變動的特性，因此適合用於土地可利用性受限的城市區域中的滯洪池環境，進而達成水質改善、減少優養化現象、利於水中生物生存以及提升水體自淨力等優點。然而 FTW 除了架設成本之外也需要投入維護成本以利於持續運作，因此透過在 FTW 上種植經濟作物，不僅能透過植物吸收氮、磷有效淨化水質，收割作物可以避免營養元素重新轉移回水體中，還能因銷售作物獲得收入，增加經濟誘使此綠色基礎設施有維善經費得以繼續進行水質淨化作業，形成一個正向的經濟循環。

本研究為以國立臺北大學校內滯洪池為樣區，進行經濟作物物種適宜性評估。試驗物種以空心菜、萵苣等水耕蔬菜或經濟作物做為對象，觀察作物存活率及生長情形。試驗過程中一併紀錄基本水質參數。本試驗成果預期可提供都市滯洪池人工浮島經營管理相關研究數據。

關鍵詞：人工浮島，滯洪池，經濟作物，植物篩選

Abstract

Floating Treatment Wetlands (FTWs) are a type of easily deployable ecological engineering system that improves water quality by cultivating hydroponic plants on buoyant platforms. The purification mechanisms include nutrient uptake—such as nitrogen (N) and phosphorus (P)—through plant root systems extending into the water, removal of suspended solids (SS), and the degradation of organic matter by periphytic microorganisms attached to submerged surfaces. FTWs can be implemented in

existing water bodies and are adaptable to fluctuations in water level, making them particularly suitable for urban detention basins where land availability is limited. The system provides multiple ecological benefits, including water quality enhancement, eutrophication mitigation, support for aquatic life, and the strengthening of a water body's self-purification capacity. However, in addition to installation costs, FTWs also require maintenance expenditures. By cultivating economic crops on FTWs, it is possible not only to purify water through the uptake of N and P but also to prevent the release of nutrients into the water body through timely harvesting. Moreover, the sale of harvested crops can generate income, thereby offering financial incentives to support the continued operation and maintenance of this green infrastructure. This model has the potential to establish a positive economic cycle for sustainable water purification.

This study evaluates the suitability of various economic crop species for cultivation on FTWs using the detention basin on the campus of National Taipei University as the study site. Selected species include hydroponic vegetables or economically valuable crops such as water spinach and lettuce. The study observes plant survival rates and growth performance while concurrently monitoring basic water quality parameters throughout the experimental period. The findings are expected to provide valuable data for the management and operation of FTWs in urban detention basin settings.

Keywords: Floating treatment wetlands, Retention pond, Economic crops, Species selection